The Chemical Age

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The Cost of Construction

IN many industrial plants the balance between profit and loss is not altogether governed by the operating cost in materials, labour and repairs, but is also an important function of the debit items which depend upon the capital cost of the plant. Capital cost depends upon the margin of profit allowed to the constructor (which in turn fluctuates with the state of trade), it depends upon the amount of labour required for fabrication, and it depends upon the cost of the metals and other materials of which the plant is constructed. The amount of profit allowed must vary with the nature of the plant; clearly, a plant that has been designed and developed by the exercise of considerable ingenuity and brains will legitimately carry a much larger profit than standard equipment of no particular complexity, such as plain circular vessels, or constructional steelwork. It is, in general, correct to say that our method of doing business with the aid of competitive tenders, coupled with the sound trading methods of most chemical plant constructional firms, ensures that the capital cost is not unduly influenced adversely by the margin of profit allowed to the constructor.

Improved trade has led to demands for increased wages, but so far it cannot be said that these have been excessive in the engineering trades. There was an increase of 2s. per week given in equal instalments in May and September, 1935; and during 1936 there were three wage increases of 1s. per week in June, September and December—a total of 5s., which would be an average wage increase of not more than 10 per cent. The greatest fluctuations have been in regard to the price of raw material. A great deal of chemical plant is made of steel, and the position of the steel industry will be dealt with later. The chemical industry makes use of special metals and alloys. The unfortunate speculation in commodities, particularly metals, has brought about an inevitable rise in costs, and it is in the best interests of all branches of industry that this speculative operation should be stopped, if necessary even by Government intervention. We have already dealt in these columns with the subject of trade fluctuations. There is nothing more calculated to cause trade fluctuations than the sudden sky-rocketing of the prices of materials, leading inevitably to "boom" conditions often based on speculation when prices are rising, and to loss of confidence by industrialists when they have risen. Moreover, with rising commodity prices and the upward trend in the cost of living, wages increase demands become more insistent and for larger amounts. There is very strong feeling among those who are watching the trade barometer and who have the direction of businesses that it is in the interests of both employers and employed to avoid, as far as may be possible, inflation of costs, prices and wages. Those who buy chemical and other plant will agree with this equally with those who construct it.

The price of steel has not been subject to speculative fluctuation, probably to a great extent because of the British Iron and Steel Corporation's central buying scheme for pig-iron and scrap and of the price level agreements with the Import Duties Advisory Committee. It has recently been pointed out that since protection was applied in 1932, the combined cost of blast furnace coke, iron ore and scrap has risen by 50 per cent., while in the same period the prices of ten representative steel products have increased by only 14½ per cent. It is evident that the steel-makers cannot continue indefinitely to shoulder the burden, and it is equally evident that the rise of the price of the raw materials for steel-making is outside the control of the steel-maker. Coal prices have risen partly because of the increased wages at the pit, and this, coupled with the shortage of furnace coke, has sent the price of coke upwards by some 30 per cent. during the last twelve months. The price of furnace coke was admittedly uneconomically low, and has been so for years, but there is a feeling that it is now artificially high solely because insufficient coke ovens have been built since 1920.

The rising world demand for ore, coupled with the reduction in available supplies due to conditions in Spain, has been reflected in firmer prices, and an additional complication has been the heavy increase in freights. The c.i.f. price of ore has thus increased by over 33 per cent. during the past year. Again, it must be confessed that shipping has had an exceedingly bad time for many years, and freights have been uneconomically low. The profits now being made, however, appear to be excessive. Economists are disturbed by the tendency in some quarters, perhaps in some whole industries, to take advantage of the situation to increase prices artificially; a fair margin of profit will retain business prosperity, but exploitation of the situation will kill the goose that is even now laying silver eggs, and may yet lay them of gold.

In view of the rapidly rising production costs, an early increase in iron and steel prices seems inevitable, and although it should not come before the end of May, there have been suggestions that it may take place earlier. The moral would seem to be that in this rising market, those who find that new plant or new works are inevitable should place their orders at the earliest possible date, and that those who wish to incur the smallest capital expenditure must defer their orders until the re-armament programme is completed—perhaps five years hence; and that is a long time!

Notes and Comments

Merchants and Tariffs

RECOGNITION of the complete interdependence of the chemical manufacturer and the merchant has substituted cordial relations for the old antagonisms that used to prevail between the two sections of the industry. It was natural in the old days that the manufacturer should hold views in favour of high tariffs and the merchant should favour Free Trade, but in the years that have elapsed since the present fiscal system was introduced there has been a growing tendency to recognise international co-operation in industry as a more satisfactory method of settling economic differences than high protective tariffs. Successive overseas trade returns have shown that high tariffs do not always achieve the object for which they are intended, and, as Mr. A. E. Reed pointed out at the annual meeting of the British Chemical and Dyestuffs Traders' Association on Wednesday, advocates of that form of protection must sooner or later be confronted with the dilemma that payments for exports cannot be collected unless adequate imports are admitted. Specific evidence that import duties are only secondary to the law of supply and demand is afforded by the experience in the early part of this year, when additional duties of 8s. and 10s. per cwt. were imposed on sodium and potassium bichromates. The imports during the period immediately following the introduction of the higher duties were in excess of the quantities imported for the corresponding period prior to the alteration, and it is significant that nearly the whole of the increase was supplied by Russia and Japan, in spite of the fact that the higher duties were mainly intended to deter competition from those sources.

A Chemical Union

PROFESSOR J. F. THORPE, past president of the Institute of Chemistry, submitted some novel suggestions for effecting greater co-operation between the three premier chemical organisations in an address to the London section of the Institute, reported in the Journal for April. He visualised a Chemical Union, with the present Chemical Council as governing body, to which members of the constituent bodies would subscribe, say, 10s. per annum, with higher rates for Associates and Fellows. Other societies might join the Union as affiliated bodies, each of which would be self-governed subject to the general co-ordination of the Chemical Council. Each member on joining the Union would be asked what publication(s) he required, and they would be sold to him by the Chemical Council at a price to be determined by the affiliated bodies, and the money so obtained would be allocated to the society concerned. By means of annual grants the Council would make good any deficit incurred by the societies. Groups dealing with special subjects would be formed within the relative constituent bodies, but such groups would be subject to the council of the body in which they were formed. From the report of the discussion it seems doubtful whether the suggestions would find general acceptance, but they are worthy of examination. They certainly offer a means of bringing members into closer contact.

Need for Further Research

ALTHOUGH much that Mr. J. P. Dickie said about the extraction of oil from coal in his paper on the prospects of the coal industry at the Royal Society of Arts on Wednesday was common knowledge, he provided food for serious reflection in his emphasis of the need for further research on a commercial scale. Despite the progress in the application of chemical science in recent years we have yet a long way to go before the potentialities of the oil from coal industry are realised. The hydrogenation process at Billingham, the high temperature carbonisation practice of the gas and coking industries and the low temperature systems of the "Coalite" type are making their respective contributions, but as Mr. Dickie pointed out there are other processes which ought to be examined and, where they show any promise, tested on commercial lines. It has only recently become generally known through questions in the House of Commons that the Fuel Research Board is not permitted to report on processes that are still in the laboratory or experimental stage, and it is therefore impossible for the Department, as at present constituted, to render the assistance so necessary in the early stages of development. As a solution of the problem, Mr. Dickie advocates the appointment of a new "Oil from Coal" Board, free from association with oil interests, responsible to Parliament through the Mines Department, equipped with facilities either to undertake research work itself or to assist private firms or individuals to do so. The suggestion is a good one, but could not the same purpose be achieved and a multiplicity of departments avoided, by enlarging the scope of the Fuel Research Board, which already has the experience and facilities—and only lacks the authority and the means—to do what the suggested new board would do?

The Five-Day Week

THE publishers of THE CHEMICAL AGE celebrate this year the twenty-first anniversary of their adoption of the five-day week. What was a daring innovation in 1916 is an established institution in 1937. The experiment has been such a complete success that at no time in the intervening twenty-one years has a reversion to the old system been seriously considered. The relations between employer and employed were never so happy as under the dispensation by which the former close their offices from top to bottom on Saturday morning, and the latter put every ounce of energy into the five full working days that remain. The notorious dissipation of effort on Saturday mornings, which had become little more than clearing up occasions, was eliminated, and the prospect of a long week-end made the whole machine gather a willing momentum which was as sound commercially as it was effective socially. A number of firms in the chemical industry have lately begun to appreciate the advantages of the five-day week, and although there must be exceptions where supplies of chemicals for the alleviation of human suffering, or for special emergencies necessitates the attendance of at any rate a portion of the staff on Saturdays, the movement must assuredly spread.

Suggested "Oil from Coal" Board

Present Position and Prospects of the Coal Industry

THE important contribution which the extraction of oil from coal is destined to make to the future of the coal industry was indicated by Mr. J. P. Dickie in a paper on "The Present Position and Prospects of the Coal Industry" before the Royal Society of Arts on Wednesday evening.

The extent to which the oil from coal industry might be developed in the near future was difficult to forecast, said Mr. Dickie, for it involved the consideration of questions of great technical difficulty, as well as one of national policy. No one who had seen the marvellous progress made in so many fields of applied science during the last fifty years could doubt that the technical difficulties would be completely overcome sooner or later. The matter of policy could be settled only by the Government, and only when that was decided, could it be made possible for large-scale research to be undertaken on its behalf. The present position was both anomalous and unsatisfactory, for despite incessant agitation, both inside and outside Parliament, Government after Government had failed to realise the need for a long-term policy and to make adequate provision for the research work necessary to guide the nation as to what that policy should be.

An independent "Oil from Coal" Board should be established, concerned only with finding new uses for coal and its derivatives, free from association with the oil interests, responsible to Parliament through the Mines Department, equipped with its own staff and provided with ample funds to undertake research work itself or to give encouragement and assistance to private firms or individuals who are seeking to establish conditions which will make the country independent of imported oil altogether.—

MR. J. P. DICKIE.

As he viewed it all the advantages lay with home production, or at least with a policy which would give us a reasonable proportion of our oil supplies. We were an island nation, dependent largely on coal for our economic prosperity in time of peace and on oil for our preservation in time of war. We were dependent on oilfields overseas for 95 per cent. of our requirements. This had all to be transported thousands of miles by sea, a difficult matter in war time, even if the oil were available. What we had in reserve was stored in huge overground depots particularly vulnerable to attack from the air. The three branches of our defence forces were all highly mechanised, and a shortage of oil in time of war would result in a struggle between them for what was available. Napoleon said that armies marched on their stomachs. Our army of to-day marched on oil; the navy steamed on oil and the air force flew on oil or not at all. One successful air raid on one depot would have serious consequences for all three defence forces.

Duty on Imported Oil

On the other side of the balance sheet there were these factors to be considered in determining policy. The Government was itself a large shareholder in one of the most important of the oil-producing companies. There was a substantial duty on imported oil; every million gallons of home-produced oil meant a loss to the Treasury, and complete self-sufficiency would involve recasting the Budget in order to raise otherwise the £40 millions provided by the duty. A large increase in home-produced oil would mean a reduction in the number of oil tankers with a corresponding reduction in the earnings of the mercantile marine and loss of employment to seamen. It would mean also a loss of revenue to British investors in the oilfields of the world.

Looking at both sides of this picture he thought the balance of advantage lay with home production to the utmost limit consistent with economic considerations. And in this matter economic consideration did not mean simply and solely cheapness. There was a real danger that sooner or later we should be compelled to fight in a quarrel we would willingly avoid, but which, if it should come, would be waged not in defence of the interests of others, but of our own. In such a struggle oil would be a vital factor and it was this which made it quite impossible for us with a world-wide Empire and world-wide commitments to look at the question solely from the economic point of view.

The two processes by which oil was now being produced here were the hydrogenation process and the carbonisation processes, high and low. The hydrogenation process was the only one established for the sole purpose of producing oil, the benzol, spirit and tar oils obtained from the carbonisation processes being by-products in the manufacture of gas, metallurgical coke and smokeless fuel for domestic purposes.

The only plant operating a hydrogenation process commercially in this country was that of Imperial Chemical Industries, Ltd., at Billingham. It worked on the Bergius system, all the patents in which are held jointly by the I.C.I., the Standard Oil Co. (N.J.), the I.G. Farbinindustrie A.G. (Germany) and the Royal Dutch Shell Group through the International Hydrogenation Patent Co., and all the information available from the research work conducted by any branch was available for all. The British plant was designed for the production of 150,000 tons of petrol per annum. It was started up on creosote in February, 1935, and in June, 1935, on coal. The process was one in which petrol was produced from a mixture of pulverised coal and either creosote or residual coal oil, or direct from either of the latter, and was one in which petrol, diesel oil or fuel oil could be produced as desired. The central feature of the process was that gaseous hydrogen was supplied to the oil or the mixture to make up the deficiency in the latter. This was carried out at high temperatures and under very great pressure in the presence of a catalyst.

Enormous Technical Difficulties

The enormous technical difficulties which had to be faced had been almost overcome; the plant was now producing at nearly the full capacity for which it was originally designed. The total quantity of coal consumed at the hydrogenation plant in the whole series of the operations, including the raising of steam and the manufacture of hydrogen, was 600,000 tons per annum: Billingham used twice this quantity on all its operations, but this was the figure for hydrogenation.

While this process might now be said to be established technically, no figures were available as yet on the economic side of the business. The cost of production was high, and operation was only made possible by the remission of the duty on imported hydrocarbon oils. This remission was at the rate of 4d. per gal. for nine years, and was, of course, available for all home production by any process. At the current rate of preference of 8d. the period was thus only 4½ years. The fact that production now approximated to the designed capacity, however, would seem to indicate that with this measure of protection, the costs were coming out on the right side and the business getting on to a profitable basis. On this, of course, and continued tax remission, would depend the question of whether any additional plants of the same magnitude would be laid down. In Germany considerable progress had been made in the production of motor spirit by the Fischer Tropsch process. In this system water gas was produced from coke under special conditions and in the presence of a catalyst. It was understood that semi-coke produced by carbonisation of coal at low temperatures was the most suitable for the process. This method had not yet been tried out in this country, but must be reckoned with when considering the future production of oil from coal by any process. Of

and the quantity produced, important and valuable as it was, the high-temperature processes it need only be said that the output must of necessity be relatively small, for the tars and benzol were only products in the manufacture of gas and coke could never become a big factor in the total supply.

The low-temperature process was now, however, not only firmly established technically, but was on an economic basis and capable of very great expansion. Its principal product being smokeless fuel and a ready market available for the whole output at good prices, its success did not depend entirely on the production of oil. The oil, however, was a very important part of the process and could be, in conjunction with hydrogenation, an appreciable contribution to our needs. The principal firm operating the process was Low Temperature Carbonisation, Ltd. The yield from a ton of good washed bituminous coal was 3 gal. of petrol and 18 gal. of crude coal oil. The former was of excellent quality and was in daily use in aeroplane work. The coal oil was suitable for hydrogenation and was being supplied in large quantities to the I.C.I. for this purpose.

The two processes being complementary it should be possible for them to work in co-operation as soon as the hydrogenation process is firmly established. Whilst it would be technically possible to put down a small hydrogenation plant to work in conjunction with every low temperature plant, it would be economically unsound. The future development of these processes might be, therefore, on the line of half a dozen plants in each coalfield, with a central hydrogenation plant taking the whole of their output of coal oal for the production of motor spirit.

Such a development, however, covered only the known processes and this was not enough. A new organisation was required for further research work on a commercial scale, as recommended by the Samuel Commission, for there were other processes which ought to be examined and where they showed any promise tested on commercial lines. The Fuel Research Board was not permitted to do this; in fact, it was not allowed to report on any process which was still in the laboratory or experimental stage, a fact which had only become generally known recently through questions in the House of Commons. Even the late Commissioner for the Special Areas, Sir Malcolm Stewart, was apparently not aware of this, for he attached great importance to the establishment of plants for the extraction of the "latent products" of coal, but recommended, in his first report that "before schemes are launched on the public, they should be submitted to the independent authoritative tests of the Fuel Research Board."

This question was of such supreme importance to the nation that an independent "Oil from Coal" board should be established, concerned only with finding new uses for coal and its derivatives, free from association with the oil interests, responsible to Parliament through the Mines Department, equipped with its own staff and provided with ample funds to undertake research work itself or to give encouragement and assistance to private firms or individuals who are seeking to establish conditions which would make the country independent of imported oil altogether. In a world which we regarded as being so full of danger that we were spending £1,500 millions on defence, a few millions invested in this direction would be money well spent and even if the effort failed, it would be money well lost. Germany had realised the folly of relying on imported oil, was reputed to be now producing nearly half her requirements from lignite and other indigenous materials, and was aiming at self-sufficiency, irrespective of all normal economic considerations. We needed the oil and the manner in which we wasted the "latent products" of our greatest asset, by which we might obtain it, could not be better illustrated than by the activities of the London Passenger Transport Board. This body used half a million tons of raw coal in producing part of its electric current. In doing so, it used up in combustion the "latent products" from which could be obtained the oil to drive its own buses. Ton for ton the calorific value of the raw coal was about the same as that of the smokeless fuel which it might use if the raw coal had yielded to science its latent products.

Painting Tests on Iron and Steel

Work of the Corrosion Committee of the Iron and Steel Institute

DR. J. C. HUDSON, investigator to the Corrosion Committee of the Iron and Steel Institute, the British Iron and Steel Federation and the Iron and Steel Industrial Council, discussed some of the work that is being done by this committee, in a paper which he read before the Oil and Colour Chemists Association in London on April 8, Dr. G. F. New (president) being in the chair. The committee is engaged on a complete investigation of all matters relating to the corrosion on ferrous materials, and as part of their researches, a large number of painted specimens have been exposed to the atmosphere at sixteen stations, of which nine are in this country and seven overseas.

The materials under test include ordinary mild steel; mild steel containing small quantities of copper and/or chromium, ingot iron and three types of wrought iron, *i.e.*, Staffordshire, Scottish and Swedish, the Swedish wrought iron being without and with a small percentage of copper. Specimens of these materials have been prepared in various surface conditions and painted by one or both of the following standard procedures prior to exposure at the corrosion stations:—(a) Two coats of red lead paint followed by two coats of red oxide paint; (b) two coats of red oxide paint alone. Swedish iron has been found definitely more corrodible than mild steel in the unpainted condition.

Although it is not yet possible to give the final result of these tests, Dr. Hudson briefly indicated some provisional conclusions. First, good paint when properly applied under good conditions will afford perfect protection to iron and steel for a large number of years; at many of the exposure stations most of the specimens are in almost perfect condition after exposure for five years or more. Secondly, the surface condition of the metal over which the paint is applied has a very marked influence on the protection given by the paint; the surface condition, indeed, is probably of greater importance than the composition of the paint itself in determining the life of the initial paint coating, at least in our climate. Thirdly, a partially weathered surface, where part of the rolling scale and some rust are left on the metal beneath the paint film, is by far the worst on which to apply paint. Fourth, the best results have been obtained on specimens from which the rolling scale has been completely removed either by pickling or sand blasting prior to painting. Fifth, the behaviour of specimens painted over an intact rolling scale, *i.e.*, one that has not been exposed to corrosion, appears to be intermediate between that of weathered and of de-scaled specimens; in actual practice, however, it is difficult to maintain an unbroken and undamaged scale on structural material up to the time of painting and the presence of rolling scale which might flake off under the paint on any structure exposed to vibration would constitute a source of weakness. Evidence is also accumulating that the base metal plays a part in determining the life of a paint film. For example, it would seem that the paint behaves rather better on copper-bearing steel than on ordinary steel.

Dr. Hudson indicated some possible subjects for future research and suggested in the first place that the problem of preventing the corrosion of iron and steel is capable of solution by the development of steels that are completely resistant

to corrosion and by the use of protective measures. In connection with protective coatings for iron and steel, further research work seemed necessary in three directions, namely, the effect of the surface condition of the metal on the life of the protective coatings, the development of improved protective coatings, and the effect of the conditions of application. It was generally agreed that the presence of rust and particularly scale beneath the paint is decidedly injurious, and, on the whole, the general view is that it is desirable to ensure that all scale is removed prior to painting, either by mechanical processes such as sand blasting or pickling. The only practical objection to this seemed to be enhanced initial cost, but this was rapidly disappearing as a result of the demonstration by experimental work of the markedly increased life of the coating obtained when the metal is de-scaled.

Referring to the various methods of surface treatment of steel to improve corrosion resistance, Dr. Hudson said the application of surface washes of phosphoric acid in alcohol solution to de-scaled steel surfaces, which gives a very good surface for painting, has been rendered an economical one as the result of research work by Dr. H. B. Footner and his colleagues in the research laboratories of the Asiatic Petroleum Co., who have also shown that equally good results can be obtained by a duplex process in which the actual de-scaling is conducted in sulphuric acid and after an intermediate washing the steel is finally dipped in a hot dilute solution of phosphoric acid. Reference was also made to the development of more efficient types of de-scaling and to research on surface pre-treatment before painting, such as spraying the surface of the steel with metallic coatings for treatment by a chemical process before painting. Special mention was made in this connection of excellent results obtained with steel sprayed with aluminium.

As far as galvanising is concerned, it was remarked that this is approximately 15 times less corridible than iron, and that in an average urban atmosphere a coating of zinc of 2 oz. per sq. ft. of surface, *i.e.*, 1/300th inch thick, should afford protection for about 10 years.

Red Lead Paint

Referring to the development of improved protective coatings, it was stated that it is generally accepted that the pigment used in priming the coats for steel work exposed to atmospheric corrosion should be of an inhibitive type, *i.e.*, one that has a definite chemical action on the metal tending to produce passivity. Red lead paint of good quality was mentioned as undoubtedly one of the best, if not the best, material to use for this purpose. On the other hand, the labour involved in the application of straight red lead paint weighing say, 28 lb. per gal. is definitely greater than that in the case of, say, red oxide paint weighing 20 lb. per gallon, and this seriously affects the cost. It is thus of direct moment to decide whether the value of a red lead paint is very largely connected with the high pigment concentration that can be obtained or whether it is possible to dilute the red lead pigment with other pigments such as red oxide, clay, or silicon carbide, without reducing its inhibitive power whilst greatly increasing its brushability. If so what is the optimum composition of the pigment?

The choice of the best medium for protective paint still seemed to be very largely empirical, and it was suggested on general grounds that the ideal protective film of paint as applied to structural steel work in the open might be regarded as consisting of three layers, namely (1) an inhibitive priming paint having the function of keeping the metal in a passive condition and thus preventing the removal of the paint as a result of corrosion beneath it; (2) an intermediate layer of high impermeability, preventing the access of moisture and corrosive gases to the metal, *i.e.*, protecting the metal by mechanical exclusion; and (3) an outer layer chosen for its stability to atmosphere and sunlight which would shield the lower layers of paint that are actually protecting the metal. The ideal would be to combine all these three desirable properties in a single paint.

Finally, the effect of the conditions of application were discussed and it was suggested that definite answers are required on such questions as the humidity at which it is desirable to leave off painting steel work, and what is the effect of relatively high or low atmospheric temperatures at the time of painting. Another matter mentioned in this connection was the effect of the human element, it being remarked that it is useless for the metallurgist to secure a perfect surface, and for the paint technologist to devise a perfect paint if the paint is improperly applied.

Points from the Discussion

Dr. V. G. JOLLY (Manchester) speaking with regard to red lead, said this was a very heavy paint and objection was sometimes raised that it was difficult to brush. Recently, however, he had come into touch with what he believed was an entirely new form of red lead. It was more voluminous than the ordinary type of highly dispersed red lead, and although he did not know the weight per gallon of paint produced from it, he had been given to understand that the actual labour involved in putting on that paint was considerably less than with ordinary red lead paint. At the same time he did not know whether the corrosion resisting properties of this paint were an improvement.

Mr. T. HEDLEY BARRY asked whether it was possible that modern methods of the manufacture of steel which involved drastic tests at high temperatures and severe rolling led to a strained condition of the steel, making it more sensitive to changes, this being reflected in sensitivity to oxidising influences. He believed that Dr. Friend, some years ago, pointed out that iron in a state of strain corroded more readily than iron not so strained, and anyone examining exposure fence tests would know that corrosion started at any point where the metal had been put under strain, as, for example, where the plates were drilled for attaching to the frame.

Mr. N. BENNETT suggested that if mill scale was completely removed from steel the paint would look after itself. Referring to the suggested three-in-one paint of the author, he said that although it would not be ideal from the paint manufacturer's point of view, it did not seem likely to come about because the behaviour of the three coats was so entirely different. The priming coat to be an inhibiting one must be of small particle size. The second coat must have excluding properties and be pigmented with something of a flaky nature. Thus there was immediately a contradiction in ideas because they would be trying to get a very small particle material combined with one containing large particles. He suggested that the paramount factors in this problem were outside the control of the paint manufacturer, and until such matters as surface conditions, the human factor and so on, were controlled, he felt the paint trade was entitled to a rather fairer and perhaps more sympathetic attitude from users than had hitherto been the case.

Test Panels at Paint Research Station

Mr. W. GARVIE, commenting on the views held as to the quality of steel to-day, as compared with that made years ago, said the Clyde shipbuilders definitely held the view that modern steel does not stand up to corrosion in the way that pre-war steel did.

Dr. R. F. HANSTOCK said there were some small panels exposed at the Paint Research Station at Teddington, and they consisted of steels of different kinds painted with different paints and anti-corrosive pigments. These specimens had been exposed for some three years, and the results so far showed differences more or less corresponding to those which the author had mentioned. The tests were still going on.

The PRESIDENT pointed out that the panels referred to by Dr. Hanstock were provided by Dr. Hudson, who had been very kind in sending authentic material of know history and known preparation. For that reason it was hoped to avoid many of the difficulties which were encountered when steel of unknown history was used.

British Chemical and Dyestuffs Traders' Association

Optimism at the Annual Meeting

A RECORD attendance at the luncheon and an optimistic tone regarding the position and prospects of the chemical trade were the features of the fouteenth annual meeting of the British Chemical and Dyestuffs Traders' Association at the Waldorf Hotel, London, on Wednesday. Presiding at the business meeting, Mr. A. E. Reed, chairman, said the work of the Association had given general satisfaction, both that performed on behalf of members individually and for the trade as a whole. They had witnessed a constant growth in the volume of Government regulations and restrictions, and had been faced by frequent changes in trading conditions. Inquiries had been dealt with on such matters as trade agreements, clearing arrangements, the operation of tariffs, and on many other subjects of everyday importance to the trader.

Features of the Year's Work

Assistance in the settlement of disputes with the department of Customs, and advice on matters of procedure were instances of the ordinary work of the Association and its influence in expediting the quick clearance of goods held up at the docks had proved of great value.

In the early part of the year an application was made by the home makers for additional duties on sodium and potassium bichromates. Certain members of the Association were interested parties and the case presented many difficult aspects. Representatives of the Association attended a conference with the home makers and every endeavour was made to find a solution satisfactory to all parties. Ultimately the Import Duties Advisory Committee recommended the imposition of total duties of 8s. and 10s. per cwt. respectively. The imports of bichromates during the period immediately following the introduction of the higher duties were in excess of the quantities imported for a corresponding period prior to the alteration, and it was significant that nearly the whole of the increased imports were supplied by Russia and Japan in spite of the fact that the higher duties were mainly intended to deter competition from these sources.

It was becoming increasingly evident that high tariffs did not always achieve the object for which they were intended. Advocates of this form of protection must sooner or later be confronted with the dilemma that payments for exports could not be collected unless adequate imports were admitted. We could not monopolise our own markets and expect to share other markets at the same time, and he welcomed the growing tendency to recognise international co-operation in industry as a far more satisfactory method of settling economic differences than high protective tariffs.

He expressed a warm appreciation of the manner in which the members of the Import Duties Advisory Committee had dealt with the many difficult problems placed before them. Whenever they had occasion to approach the committee, they knew their views would receive sympathetic consideration. The Key Industry Duties were renewed for a further period of ten years. The trade had been a little anxious to know in what form the safeguarding of key chemicals would be continued, and the decision to renew the duties on the existing basis was received with general satisfaction because as merchants it was essential that they should enjoy conditions that brought about as few changes as possible.

The Poisons Rules

Throughout the year the Association was occupied with problems arising out of the operation of the Poisons Rules. Although wholesalers were outside the scope of many of the provisions there were certain rules with which they must comply. The complicated nature of the rules had necessitated much work in answering queries raised by members concerning the labelling of poisons and the containers in which poisons were supplied, stored or transported. The Association had maintained cordial relationships with all the Government Departments. With the chemical trade more and more controlled by Parliamentary Acts and Orders there was much scope for co-operation between the official departments and trade associations.

We were passing through a period of national prosperity, but real prosperity must depend on participation in a revival of world trade, and unless there was a considerable improvement in the international situation we could not expect sustained industrial activity. Trade between one country and another was build up on merchanting activities. The merchant had survived the wave of economic nationalism through which we had been passing because the merchant provided an absolutely essential service in the process of exchanging goods and the provision of supplies. Undoubtedly the merchant was the best selling medium for the manufacturer, and the merchant as a supplier gave the consumer every necessary convenience.

The following officers were elected: President, Mr. Victor Blagden; vice-presidents, Mr. A. F. Butler and Mr. S. J. C. Mason; chairman, Mr. J. F. A. Segner; vice-chairman, Mr. F. A. Waugh; hon. treasurer, Mr. W. Beckley; hon. auditor, Mr. B. C. Hughes; executive council, Messrs. O. F. C. Bromfield, H. Gilliat, A. E. Reed, and C. H. Wilson.

At the trade luncheon which preceded the meeting, Mr. W. J. U. WOOLCOCK proposed the toast of the Association. In these days of legislation by reference, he said, the need for such an association was greater than ever. A head of a Government Department needed a body to which he could turn for information, and the traders themselves could not afford to be outside an association lest their voice became a voice crying in the wilderness. The Import Duties Advisory Committee, as an example, welcomed and encouraged such an association representing the interests of a trade in preference to individuals.

Serving the Producer and Consumer

Mr. VICTOR BLAGDEN, president, in response, said the Association did more than look after the interests of its members; it had set out never to do anything against the national interests, and secondly to serve not only the producer who entrusted the members with the sale of his goods, but also the consumer. The merchant should be encouraged particularly in these difficult days when he was hampered by all kinds of restrictions such as tariffs, bounties, currency and worst of all that antediluvian system of barter between governments. The merchant was essentially a pioneer who opened up new markets and doing so took a considerable financial risk.

Export trade could be increased only by removing some of the barriers and giving the merchant a free hand. He hoped the Government would succeed in achieving something in that direction. He appreciated the difficulties the Government had at present to contend with, and he also saw the tariff reformers' point of view, but in the long run if they wanted to export they must import—trade could not all be one way. In pleading the merchants' cause he would do so with impartiality, as having been a merchant for 50 years he had also during the last 30 years been a manufacturer, and could therefore view the subject from both angles.

Mr. A. E. REED proposed the toast of the guests and read a telegram from Dr. E. Leslie Burgin, Parliamentary Secretary to the Board of Trade, who had promised to attend, but had been prevented by duties at the Sugar Conference.

Sir PERCY ASHLEY responded to the toast and referred to the latest overseas trade returns which showed that for the first three months of this year exports of chemical products had increased by something like £800,000, a sure sign of increasing prosperity.

Prevention of Disease in the Chemical Industry

Discussion on Dr. Donald Hunter's Paper

MANY important points were raised in the discussion on Dr. Donald Hunter's paper on "Prevention of Disease in Industry" at the meeting of the Institution of Chemical Engineers on March 24, presided over by Dr. William Cullen. A report of the paper appeared in THE CHEMICAL AGE last week (pp. 318-321).

The PRESIDENT referred to the fact that girls employed in the picric acid factories during the war had suffered yellowing of the hair and skin. The yellowing had disappeared within a few months after they had left the industry, but he wondered whether there had been any permanent effects.

Dr. J. C. BRIDGE (H.M. Senior Inspector of Factories) said that, judging from the paper, he and his colleagues were not doing so badly as they might have thought in the prevention of industrial diseases. A very peculiar disease of the nervous system which recently was made notifiable was poisoning by manganese. Manganese dioxide was used extensively in this country for making dry batteries, and the Home Office wanted to ascertain where cases occurred, if they did occur.

Educating the Worker

Mr. C. S. ROBINSON, who commented on the vastly increased responsibilities thrown upon those managing chemical works during the last 25 years, said that his own firm believed in being ahead of legislation in such matters. Most of the works of his firm had had a medical service for some years, and they regarded the dental service as an extremely important part of the general medical service. Examination of workers had indicated that probably 90 per cent., of the unfit or defective people were suffering from dental trouble. There still seemed to be a strong feeling on the part of the workers against medical examination, presumably by reason of a feeling that the relatively unfit would be denied employment. They had still to be educated to the view that the medical examination of all workers entering industry was to their benefit.

Mr. W. H. CADMAN referred to the dermatitis which had been common among paraffin shed workers in connection with petroleum refining, and said the precautionary measures were regular medical inspection, baths (in connection with which a great deal of attention had been paid to the use of non-irritating soap, and the rubbing of prophylactic ointment on exposed places before the men commenced work, the ointment being made up of olive oil and lanoline), and the removal of the susceptible men to other duties temporarily in slight cases or permanently in more severe cases. In distribution, occasionally the drivers of petrol lorries or employees at filling installations might contract dermatitis. Such cases were rare, however, and the precautions taken were the same as those already mentioned.

Handling Ethyl Spirit

Special precautions were necessary in the handling of ethyl spirit by reason of the toxicity of ethyl compounds. Only selected men were employed in the distribution of it, and they were regularly medically examined. The blending apparatus was kept out of doors, in open sheds, and in the course of blending neither ethyl nor ethyl spirit came into contact with the blenders' skin. In "Tetra Ethyl Lead and Industrial Hygiene," by Dr. Harold Valentin, late resident chemist at the Paris Hospitals, it was stated that tetra-ethyl lead offered itself as a poison, of which the dangers, generally exaggerated, could be neutralised by the strict application of rigorous hygiene measures. Under those conditions, confronted by the interest which was offered for aviation and motoring by the use of tetra-ethylated motor spirit, it should be considered that no major reason could be offered against the use of tetra-ethyl lead in France until a replacement product was found which, to the same anti-detonant qualities, added the advantage of less toxicity. Mr. Cadman added that efforts were being made, with considerable success, to find a substitute. Poly dope was coming into the picture; the polymerisation of the refinery gases, the higher hydrocarbons such as propane, butane, and so forth, into motor spirit, which had every high anti-knock properties, was being developed, and the day was not far distant when every refinery throughout the world would have a polymerisation plant, as part of its normal refinery equipment, to convert what were hitherto more or less useless gases into very suitable substitutes for tetra-ethyl lead.

Mr. J. E. BOOTE also referred to the precautions taken against the development of dermatitis in employees of the oil refinery, and said that by providing regular bathing facilities the really bad development of it was avoided.

Experiments with Mice

Mr. K. L. EMLER asked whether synthetic methyl alcohol had any special action other than narcotic. Experiments with mice, etc., seemed to indicate that acetone had a more powerful initial effect than methyl alcohol, but that methyl alcohol killed more, or its effect lasted longer. He asked whether it was likely to have similar effects on human beings. With regard to a statement that organic dusts were comparatively innocuous, he asked whether cases of lung trouble had arisen due to bone dust arising from the dry grinding of bone meal.

Mr. W. CARROTT referred to a hygienic and cheap respirator, which had been developed by the lead industry, and which was effective and easy to wear. It consisted of a plain piece of muslin tied across the face with tapes, there being inside the muslin a piece of gauze-covered cotton-wool, ¾ in. to ½ in., thick, which acted as a perfect filter. The gauze was thrown away and replaced by a new one every time a man took his respirator off; it was therefore hygienic and did not become a receptacle for germs or dusts. The respirator was quite a success in the lead industry, which required as good a respirator as any other industry.

With regard to a statement that the use of spray pistols would be dangerous for spraying lead paints, he said he believed the spraying of lead paints was prohibited (a lead compound was one containing more than 5 per cent. of lead), so that the danger should not exist if the law were complied with.

Selection for Certain Industries

As to the difficulty of selecting for certain industries employees who would not be susceptible to certain poisons, Mr. Carrott said that before any persons were employed at his company's lead works they were examined by a doctor, who endeavoured to select those which were and those which were not suitable. An anæmic individual would not be employed; but other matters were considered, of course, in addition to anæmia. On the principle that difficulties which arose in works should be mentioned, so that others might avoid them, he mentioned an occasion on which dust from a refining pot, containing metallic oxides, was watered down in compliance with the Factory Acts, and arseniuretted hydrogen was produced and had affected two men. Probably at that time the presence of arsenic in the material was not suspected, and even if it had been they would probably not have thought that it would decompose and produce arseniuretted hydrogen by reason of the water used.

Mr. E. EVANS JONES said he had watched the disappearance of one or two of the diseases which had been common in the oil refining industry in earlier days. One of those was the troublesome dermatitis known as paraffin plux among

operators in the paraffin sheds, and the only cure for it was personal cleanliness. In modern refineries in this country bathing facilities were splendid and the men were taking pride in keeping their bodies free from paraffin plux. Palm oil and lanoline was being used, and the men changed their underclothes and top clothes frequently.

Although most of the refining clays used in the oil industry consisted of aluminium silicates, and were in an extremely fine state—down to or beyond 300 mesh—he had not yet seen a single case in which an employee had suffered from the use of such material, presumably because tremendous care was taken to ensure that the men wore respirators. The men were glad to wear the respirators, because the discomfort of the dust when unloading the materials was greater than the discomfort of the respirators. Another method of preventing dermatitis in men employed in de-waxing operations was the use of the modern process utilising remote control of the filter press, so that a press had not to be opened at all except to repair a mechanical fault.

Hazards of a New Industry

When dealing with certain oils, it had been found that it was difficult to remove carcinageneity (as indicated by specific refraction) by treatment with sulphuric acid, and solvent extraction (as indicated by specific refraction) appeared to be a more efficient method of removing carconogeneity.

Mr. H. W. CREMER said it seemed that the chemical engineer rose to the occasion when he knew what to rise to; to be wise after the event was inevitable. It was extremely difficult to predict what would happen when a new industry was started, and it took years to find out. Speaking as a teacher, he suggested that we might make an earlier start. In earlier days students either had the idea that everything in chemistry was poisonous and, therefore, must be handled with great care, or they were rather callous. He would never forget the shock he had experienced when he had suffered from nitrous oxide poisoning; it was a most insidious kind of poisoning. He urged, therefore, that knowledge of that sort of thing should be given to students at an early stage; it should not take more than a minute or two, for instance, to tell them the insidious nature of nitrous oxide poisoning, and the dangers of misuse.

The conditions under which the making of TNT was commenced in 1915 and the conditions applying at the end of the war were very different. As the result of experience not only was the health of the workers safeguarded, but that was accompanied by improvement of the economy and efficiency of the process. Thus the chemical engineer was a benefactor not only to the workers but also to the more dividend-minded people.

Alumina and Silica

Mr. FREEMAN HORN, who said there was no industrial disease in the aluminium industry, pointed out that alumina was very similar to silica in physical and other properties and in many industrial processes it could be used in place of silica, which latter gave rise to silicosis when in a fine condition. He had been engaged for some time in developing the use of alumina in place of silica for several purposes, chief among them being in the bedding of china in the pottery industry, and the success achieved was such that he believed alumina would soon be almost universally employed for that purpose, at any rate in this country. Alumina might be used instead of silica in polishing powders also, and it was making great strides in that direction.

Having been working very closely with a factory inspector in the Potteries in connection with his experiments, he had been impressed by the extraordinarily friendly manner in which that inspector had been met everywhere and his complete freedom of entry into the works. That was due to a very large extent to the very human attitude which the factory inspectors adopted. The time had passed when they enforced the law simply because it was the law; they interpreted it in the spirit rather than the letter. If an industrialist were really trying to avoid risks, the factory inspectors helped all they could; if, however, an industrialist was simply trying to get out of it, the story was different.

Mr. ALLAN J. HOLDEN pointed out that chemical manufacturers were mostly aware of the toxic properties of their products, and they took reasonable precautions, but considerable difficulties sometimes arose from the attitude of the users. The main trouble arose with the small user rather than the large user. Sometimes small users would not take precautions with regard to solvents, for instance, and the problem of imposing regulations concerning their use had been considered seriously. The manufacturers were trying to educate users, therefore, by drawing up a pamphlet of simple precautions for users of chemical solvents, which precautions the Home Office Inspector would try to impress upon users.

With regard to the education of chemists in the making, he said the manufacturers had a set of model safety rules for use in chemical works, drawn up in conjunction with the Factory Department of the Home Office; there was also a set of safety circulars and a safety summary, which collected monthly and quarterly items of interest from the technical point of view in connection with chemical processes, accidents, etc. They were available to chemical teaching establishments on special terms. Over and over again in the past accidents had occurred because people had plunged into new processes without a knowledge of the properties of the materials they used, and without making any attempt to find out. He urged that those who were adopting new processes and using new materials should make some attempt to consult the literature or, perhaps better still, to consult men such as Dr. Hunter or Dr. Collier, of Birmingham, to find out what was known about those materials. If that course had been followed dioxan poisoning would not have arisen.

Organic Vapours

Mr. W. C. PECK said that nearly all organic vapours were toxic, and that whilst every precaution was taken in their production in order to protect the persons engaged in manufacture, the users might be in danger because they were working in air containing those vapours. Frequently the information necessary to evaluate danger was lacking. The reporting of relatively few fatalities in the technical Press could only point to a greater number of cases in which the poisoning was sub-lethal. Small doses of chemical poison might be destroyed without apparent ill-effect; therefore, the danger of a new process was realised only when serious symptoms developed from excessive dosage. The health hazards of ethylene oxide, for instance, were reported to be due mainly to low concentrations endured for a period long enough to cause marked irritation of the respiratory system. Reports on experiments with guinea pigs were sometimes misleading. For instance, in regard to dioxan it was reported that no serious acute poisoning would be experienced if eye and nose symptoms were regarded as warnings to avoid further exposure. Yet five factory workers had died. In view of the solvents that were being used for the preparation of materials that enter foodstuffs, greater alertness to possible poisoning must be maintained.

Sources of Information

Dr. HUNTER, replying to the discussion, said there were some medical books containing extensive bibliographies, which might be of considerable help to those in industry who were safeguarding health. One of the best books on industrial toxicology was written by Professor Alice Hamilton, of Harvard University. Sir Thomas Legge had written a book on "Industrial Maladies," but it had not a very large bibliography. Dr. Hunter added that some of his own lectures on the subject had been re-printed under the title "Occupational Diseases," which contained a very extensive bibliography. Industrialists should adopt methods for keeping literary files up to date.

Replying to the president, he said the effects of picric acid were local; picric acid did not attack the tissues of the body and had not caused toxic jaundice.

He was unable to reply to the question concerning the narcotic effects of acetone as compared with synthetic methyl alcohol; but methyl alcohol had caused a great deal of trouble in the United States, because it attacked the head of the optic nerve just by the retina and caused total blindness. On general principles one regarded methyl alcohol as a deadly dangerous substance to anybody in constant contact with it in badly ventilated spaces.

With regard to dusts, Dr. Hunter said that the cleaning of carding machines in the cotton industry resulted in asthma; the men did not get silica in the lungs because there was no silica in cotton. Bone meal grinding would not cause silicosis, but it might cause asthma; tobacco and cigarette cutters, fur cutters and others who dealt with vegetable and animal dusts suffered asthmatic attacks. After all, one could suffer from asthma for 30 or 40 years, but if an asthmatic person worked in an asbestos factory he would be lucky to be alive in four years. One could not but regard silicates and silica as absolutely deadly as compared with calcium rocks and organic dusts from animals and plants. The advances made in connection with respirators were valuable, but the main principle must be to remove dust at its source.

Finally, Dr. Hunter emphasised the necessity for publishing facts with regard to industrial diseases so that steps might be taken to avoid them.

Ancillary Industries of Calcium Carbide Production

By H. C. PINCAS, Ph.D.

DEPENDING on whether calcium carbide is manufactured in the classical manner discovered by Moissan, *i.e.*, by interaction of calcium oxide and carbon, or after modern methods by the interaction of phosphate rock or calcium carbonate and carbon, quite different opportunities for ancillary industries arise, that can be attached to the carbide production.

It must be remembered that the most suitable temperature for the manufacture of carbide from CaO and C, which is an endothermic process necessitating 11.8 cal. per one molecule of CaC_2, lies somewhere between 2,200° and 2,300° C, at which temperature the carbide formed, together with unchanged CaO and C, leaves the furnace as a fluid. In the homogenous solution of calcium carbide and calcium oxide, consisting of three components, one phase disappears, and the system becomes di-variant. Thus, the pressure of carbon oxide, evolved in the process, depends on the temperature and the CaC_2 content of the mixture; from this it can be concluded that, as the carbide process runs at ordinary pressure, the output grows with the temperature. It is also known that the whole process is completed in a single stage.

Two Temperature Stages

When, however, calcium carbonate or phosphate are used as raw materials quite different conditions prevail. To begin with the latter, it has long ago been proved that the simultaneous production of carbide and phosphorus from rock phosphate is possible, but the carbide obtained in this way always contained considerable amounts of phosphide which was imparted to the acetylene, so that the latter became improper for further uses. To eliminate PH_3 from C_2H_2 is a very tedious and costly process. It was therefore progressive when it was found that the process is feasible when worked in two temperature stages (Ger. Pat. 609,730). In the first stage, ranging from 1,000° to 1,600° C. the phosphorus is driven off completely, and in the second stage, ranging from 1,600° to 1,900° C. the carbide is formed. If the reaction is carried out in a nitrogen atmosphere the final product will be calcium cyanamide, when the flux is allowed to cool down to about 1,100° C. and is kept on this temperature for a longer period.

When calcium carbonate is used the following reactions take place :—

(1) $CaCO_3 = CaO + CO_2$

(2) $CaO + 3C = CaC_2 + CO$.

Here, also two temperature stages have to be observed. The first lies at 950° C., where the carbonate is converted into the oxide, whereby CO_2 reacts with C to form CO; the second ranging from 1,600° to 1,850° C. where the carbide is formed (Ger. Pat. 620,888). By using nitrogen calcium cyanamide can also be made.

In order to utilise natural gases rich in methane, it has been recently tried (Amer. Pat. 1,996,185) to use the gas for a carbide production, and it is interesting to note that the conversion is completed at approximately 1,400° C. when all the calcium oxide or hydroxide used is transformed to carbide and acetylene. So far, however, nothing is known about a practical utilisation of this process.

Comparing the newer methods with the old one it must be stated their great advantage is the lower temperature, which has a favourable effect upon the consumption of the electrodes, the refractory furnace material, and general working conditions.

Calcium Cyanamide

One of the most important products made from carbide is calcium cyanamide (well-known as a fertiliser) and raw material for other chemicals. The reaction

$$CaC_2 + N_2 = CaCN_2 + C + 67{,}000 \text{ cal.}$$

was discovered by F. Rothe when he was about to manufacture calcium cyanide from carbide and nitrogen. It is the high exothermicy of the cyanamide formation that has made it possible to manufacture the product on a large scale. It seems strange enough that the purer the carbide used, the poorer the final product in cyanamide, 23 per cent. N_2 content hardly being exceeded. It is therefore advisable to start with a carbide evolving less than 300 litres of acetylene per 1 kg., *i.e.*, a product of 70-80 per cent. CaC_2 content. On the other hand, the physical state of it, *i.e.*, the structure of the carbide crystals, influences the cyanamide output. It is also of importance whether the carbide before entering the conversion furnaces has been cooled down rapidly by artificial means, or slowly in the air. The action of catalysts reducing the reaction temperature from 1,150° C. to about 1,000° C. and less, as for instance calcium fluoride, is well known.

According to statistics from the French industry, 1 ton of calcium cyanamide of 20 per cent. nitrogen content requires approximately 800 kg. of calcium carbide, 200 kg. of nitrogen (for the production of which 40 Kwh. are required) and 360 Kwh. The carbide requires 1,000 kg. of calcium oxide, which production requires 200 of coal, 700 kg. of coke and 3,300 Kwh. This, 1 kg. of nitrogen in the calcium cyanamide requires 0.8 kg. of coal, 2.8 kg. of coke and 14 Kwh. It must be noted, however, that the energy consumption has recently been lowered to 10-11 Kwh. per 1 kg. of combined N_2.

Because of its carbon content the calcium cyanamide obtained in this way is black. The used nitrogen gas can never be fully utilised, as hydrogen is formed in the furnaces during the reaction, and purification processes do not pay. Thus, as an excess of nitrogen has always to be used, large amounts of the gas are lost. These reasons and others led already many years ago to experiments to make the product in another way, and it was the author who first tried to interact pure lime

with hydrocyanic acid ("Chem.-Ztg.," 1922, 345 and 661), which led to cyanamide according to :—

$$CaO + 2HCN = CaCN_2 + CO + H_2$$

This reaction, however, seems to be of theoretical interest only. On the other hand, it has been known that cyanamide of lime readily decomposes to ammonia and carbon dioxide when treated with water under pressure, according to :—

$$CaCN_2 + 3H_2O = 2NH_3 + CaCO_3 + 53 \text{ cal.}$$

Before the ammonia synthesis was known the above reaction was used for ammonia production on a large scale. It was, therefore, natural that experiments have been performed for the reverse reaction, but although they proved to be successful, many difficulties and obstacles had to be overcome before large scale production could be tried. First of all the reaction is a strongly endothermic one, and 50 cal. per molecule of combined N_2 in the cyanamide are theoretically necessary. The raw materials have therefore to be pre-heated, and the reaction temperature to be very high. Secondly, it was difficult to find out suitable refractories for the furnaces, which may not decompose the ammonia, or have no detrimental effect upon a mixture of nitrogen and hydrogen used instead of NH_3. Progress was finally achieved, when it was found that an addition of carbon oxide to the system reduces the endothermicity of the process to about 23 cal. (Ger. Pat. 608,621 and 641,818).

Preheating with Evolved Gases

The use of the evolved gases for pre-heating of the raw materials and other economic precautions have made it eventually possible to change the endothermic process into an exothermic one yielding 9.7 cal. The whole utilisation of heat is 4,500 cal. per 1 kg. of cyanamide nitrogen, and the heat efficiency is 65-80 per cent. The final product, the so-called "white calcium cyanamide," contains up to 26 per cent. N_2, equal to 74.3 per cent. $CaCN_2$, 16.6 per cent. $CaCO_3$, and 9.1 per cent. CaO. When chloride of calcium is used as a catalyst, the conversion temperature can be reduced to 670° C., whereby the proportion $NH_3 : CO_2$ must be kept at 10 : 1.

Reverting to carbide production directly from calcium carbonate, it may be added that a modification of this cyanamide manufacture, according to

$$CaCO_3 + 4C + N_2 = CaCN_2 + 3CO$$

allows calcium cyanamide to be also obtained. As in the case of rock phosphate, the mixture after being heated up to 1,860° C., is cooled down slowly to 1,100° C.

It may be asked what use it is to produce a high grade white calcium cyanamide when it is necessary to use ammonia or a hydrogen nitrogen mixture for it. The answer is that there are large amounts of cheap by-product ammonia in the world awaiting suitable utilisation. Not all of it can be converted into ammonium sulphate, although sulphuric acid is cheap and abundant, as it has been shown by many investigators that too much of this fertiliser is not good for the soil. Thus, the said process yielding a basic fertiliser is important when ammonia is available, and it has to be regarded at as an ammonia binding process.

Fertiliser Experiments

Another question is whether dicyandiamide, always, though in very small quantities, formed in the said process does any harm to the plants. In earlier times this was supposed, but nowadays it can be stated that dicyandiamide has no poisonous effect at all, provided the amounts are not too large, as this compound is not so quickly converted into ammonia as cyanamide. On this conversion depends the importance of the calcium cyanamide as a fertiliser. As a matter of fact the formation of ammonia proceeds over the formation of urea, and recently Rotini ("Chim. and Ind.," Milan, 1935, *17*, 14) has found manganese dioxide to be the best catalyst to promote this conversion. The activity rate of the oxides of manganese, iron and aluminium is 500 : 10 : 1, and that the optimal activity of MnO_2 is at $pH = 8.9$-9.1. Experiments made by Rotini proved that the content of the soil in manganese oxide is mainly responsible for the conversion of cyanamide into urea

Calcium cyanamide can be used as a raw material for the manufacture of cyanides, thio- and ferro-cyanides. The reaction

$$CaCN_2 + C = Ca(CN)_2 - 38{,}500 \text{ cal.}$$

is highly endothermic, and high temperatures have to be used, which, however, can be reduced by suitable catalysts. According to a well-known American process of Landis, NaF is used as a catalyst, and the American product containing 50-60 per cent. of NaCN is known as "Aero Brand Cyanide." The author has made cyanide by heating calcium cyanamide with soda ash ("Ind. Chim.," 1934, 413). Instead of sodium carbonate, carbide can be used, and an addition of iron leads to sodium ferro-cyanide ("Angew. Chem.," 1934, 733, and U.S. Pat. 2,004,130).

Another method goes by way of an alkali sulphide or hydrosulphide. According to Ger. Pat. 621,581 the conversion takes place at temperatures above 500° C. A more simple and economic process seems to be that described in Ger. Pat. 515,850, where cyanide and ferrocyanide can be made from cyanamide depending on how the process is directed. In the first stage dicyandiamide is made that with a hydro sulphide, gives thiocyanate and ammonia, but when iron is added a cyanide and iron sulphide are formed. All intermediates and by-products go back into the process which is a cyclic one.

Urea can be obtained on a technical scale from calcium cyanamide according to U.S. Pat. 1,977,210 by interaction with sulphuretted hydrogen and carbonic acid at room temperature, with a yield of 87 per cent. of the theoretical. Another process is to make a water suspension of acid calcium cyanamide, liberate H_2CN_2 by sulphuric acid at a $pH = 5$, and by a final interaction with H_2S and ammonia (U.S. Pat. 1,991,852).

There exist some connections between cyanamide and oxalic acid, but the equilibrium

$$H_2CN_2 + HCN + 4H_2O = NH_3 + (NH_4)_2(COO)_2$$

seems to have not been studied so far.

Acetylene to Acetic Acid

When carbide is produced from rock phosphate and phosphorus is obtained, quite another ancillary industry may be attached to the carbide manufacture. The conversion of a pure, sulphur and phosphorus free acetelene into acetic acid can run over acetic aldehyde, or over aethylidene di-acetate and vinyl acetate. The first method leads at first to per-acetic acid on the one, and the aldehyde on the other hand. It was discovered by N. Gruenstein. Mercury is the catalyst mainly used, and depending on whether the catalyst is prepared in the solutions or not 4-5 kg. or 30 kg. of the catalyst per ton of acetic aldehyde are necessary, respectively. It is important to run the process at a low temperature and to drive off the aldehyde as quickly as possible. One ton of the aldehyde requires 2.2 tons carbide and 450-550 Kwh. Special catalysts are used to reduce the reaction temperature in order to avoid an explosion of the per-acetic acid.

The process of the future will be an oxidation in the gas phase, so that the whole could be done in one stage. Some patents have been recently granted to such methods (Ger. Pat. 544,691, 544,784; Brit. Pat. 344,638, 425,009; Fr. Pat. 720,683, 722,190, 776,518).

If acetylene is treated in a suitable manner with anhydrous acetic acid, aethylidene di-acetate and vinyl acetate are obtained, and from them acetic acid anhydride as final product. Here mercury also serves as chief catalyst. According to Brit. Pat. 351,318, 600 g. of anhydrous acetic acid, 43 g. of H_2SO_4 and 30 g. of sulpho-acetic acid, are mixed with 30 g. of acetic anhydride, at 15° C. and acetylene is passed through the mixture; after neutralising with 50 g. of sodium acetate the whole is distilled off and 349 g. vinyl acetate, 64 g. aethylidenes di-acetate and 195 g. acetic acid are recovered. The conversion of the aethylidene di-acetate can also be effected by heating at 268° C. If paraldehyde has been formed it must be oxidised by chromic acid or oxygen to vinyl acetate to be used again (Ger. Pat. 556,775).

A new development in this field would be the direct manufacture of acetic anhydride from acetylene. Promising experiments have been recently carried out in this direction with the use of chromic acid as the oxidising agent.

The Chemical Age Lawn Tennis Tournament

Prospects and Arrangements for 1937

THE CHEMICAL AGE Lawn Tennis Tournament has become a popular institution in the social world of the chemical industry, and it is hoped that this, the seventh year, will bring an even larger entry and an even more successful tournament. We look forward to seeing all last year's entrants competing once more, and, while new competitors from London will be welcome, we extend an especially cordial invitation to tennis players in the provinces. Everything will be done to facilitate their participation; all the early round draws will be arranged according to districts, so that as little travelling as possible is involved.

As in previous years, the tournament is open to all members, both principals and staff, of the chemical industry throughout Great Britain. It will consist of a men's singles and a men's doubles competition, and the matches will be played during May and the following summer months. The winners of both competitions will hold THE CHEMICAL AGE silver challenge cups, jointly with the firms they represent, for one year, while smaller trophies will be presented outright to each of the winners and the runners-up.

During the past year the doubles cup has been held for six months by C. C. Gough and T. P. Williams, of Lever Bros., Ltd., and for six months by A. E. C. Willshere and L. F. Grape, of Borax Consolidated, Ltd. This arrangement was due to the final match being deemed a draw when it was abandoned owing to rain. The holder of the singles cup is also Mr. C. C. Gough.

The new ruling introduced last year permitting partners to be drawn, if necessary, from different firms, proved both popular and successful, and it will again apply this year. It is hoped, however, that, wherever possible, the old friendly rivalry between firms will be upheld by internal alliances.

The co-operation of a small representative committee, which was set up last year under the chairmanship of Mr. H. B. Crole Rees, proved of immense value in the organisation of the tournament. We acknowledge the committee's help with sincere gratitude, and have pleasure in announcing that a similar body will assist us this year.

All entries for the tournament must reach the Editor, THE CHEMICAL AGE, Bouverie House, Fleet Street, London E.C.4, not later than first post on May 4. Entry forms can be obtained on application, either by telephone, letter or in person, from the Editor. Competitors are urged to secure and send them in as early as possible.

The rules governing the tournament are printed below. The draw will be made on May 4 and competitors will be notified at once as to the result of the draw and the final date for playing off the first round matches. The first player or players drawn usually suggest(s) immediately to his or their opponent(s) a convenient date and place for the match, and upon completion of the event the result, signed by all players (winners and losers), is posted by the winners in time to reach the offices of THE CHEMICAL AGE by the closing date which will be announced at the time of the draw. In the case of any dispute arising between players the decision of the Editor of THE CHEMICAL AGE, acting with the tournament committee, is taken as final. The Editor and the committee also have the right to scratch any players who do not play off their matches by the stipulated dates or who fail to conform to the rules of the tournament. There is no entrance fee, but it is understood that the players pay their own travelling expenses, etc.

Rules of the Tournament.

1. Every competitor must be a member of the chemical industry, either as a principal or a member of a staff. There is no entrance fee of any kind.
2. Players in the Doubles need not necessarily be members of the same or associated firms, provided all players are members of the chemical industry as defined in Rule 1.
3. The Challenge Cups, which shall not be awarded outright, irrespective of the number of times they are won by the same players, shall be competed for annually on courts of any surface in accordance with the Rules of Lawn Tennis and the Regulations of the Lawn Tennis Association. The winners of the Cups shall make arrangements for their safe custody and insurance.
4. The competition shall be conducted on the knock-out principle, and the best of three advantage sets shall be played in all matches, except in the finals when either the best of three or the best of five sets shall be played at the discretion of the Editor of THE CHEMICAL AGE and the members of the tournament committee present at the finals.
5. **Entries shall be made not later than May 4, 1937, on forms which may be obtained on application, to :**

"Lawn Tennis Tournament,"
"The Chemical Age,"
Bouverie House,
Fleet Street, London, E.C.4

6. The draw shall be made on the first convenient day following the close of entries. The dates on or within which the several rounds must be played will be published in THE CHEMICAL AGE.
7. The Editor of THE CHEMICAL AGE, acting with the tournament committee, shall have the right to scratch any players who fail to play off their matches by the stipulated dates, or who otherwise fail to conform with the rules and regulations governing this competition.
8. Except in the case of the finals, players drawn against each other must make their own arrangements for playing off their match on a court mutually agreed upon. In the event of disagreement, the first name drawn shall have the right to choose the ground.
9. The result of each match must be sent by the winners to the Editor of THE CHEMICAL AGE, signed by all players (winners and losers), immediately after the match, and must reach the office of THE CHEMICAL AGE not later than by the first post on the day following the final day for playing off the round.
10. If any player be not present at the agreed place or time of the match, opponents shall be entitled to a walk-over, after having allowed reasonable time (say, a maximum of one hour) for the other's appearance. If the players find it impossible to play off their match on the day originally chosen, they must play it on any other day, to which both sides agree, within the stipulated period.
11. Any dispute arising between players, or otherwise, shall be referred to the arbitration of the Editor of THE CHEMICAL AGE, acting with the tournament committee, whose decision shall be final.
12. While competitors will decide as to hard or grass courts for the preliminary rounds, it must be understood that the Finals must be played on courts selected by the Editor of THE CHEMICAL AGE, acting with the tournament committee.

Letter to the Editor

British Oil from British Coal

SIR,—The British coal industry will welcome the statement made in the House of Commons on April 8 by the Civil Lord of the Admiralty in answer to a question from Mr. Graham White regarding the comparative cost of imported oil and fuel oil produced from British coal. Mr. Kenneth Lindsay corrected his previous announcement on the subject, and explained that he had been referring not to British fuel oil, but to some small purchases of a high grade liquid product of low temperature carbonisation used for a particular purpose.

The cost of this particular product bears no relation at all, of course, to the cost of British fuel oil, and it is only fair to add that many thousands of tons of coalite fuel oil have already been supplied to the railway companies and other large industrial users, and that these orders have been obtained on a purely competitive basis as against imported petroleum.—Yours faithfully,

COLIN BUIST,
Director, Low Temperature Carbonisation, Ltd.
28 Grosvenor Place, S.W.1.

Society of Public Analysts

Election of New Members

AN ordinary meeting of the Society of Public Analysts was held at the Chemical Society's Rooms, Burlington House, London, on March 7, the president, Dr. G. Roche Lynch, in the chair.

Certificates were read in favour of Robert A. Bottomley, Paul Haas, David Lambie, Harry Rainey, and George R. Howat. The following were elected members of the Society :—Joseph J. Blackie, Harold W. Christian, Walter E. Green, Norman H. Law, Leonard T. Lowe, Peter J. Markham, Hubert A. Parkes, and Robert Tranent.

Microscopical Analysis of Feeding Stuffs

In a paper on the quantitative microscopical analysis of feeding stuffs, Dr. J. G. A. Griffiths, A.I.C., dealt with the determination of rye, wheat and barley starches in mixtures, and ground oat mixtures. Wallis's "lycopodium and starch grain" counting method has been extended by ascertaining the ratio of starch grains with characteristics of diagnostic value to the total number of starch grains present. Such characteristics, for example, are the stellate hilum of rye starch grains and the large diameter of some rye starch grains as compared with the diameters of the starch grains of wheat and barley. For greater accuracy in counting the small proportions of large starch grains in a mixture, a microscope projector technique has been devised.

The Hartridge Reversion Spectroscope

The Hartridge reversion spectroscope was the subject of a paper by Mr. R. C. Frederick, F.I.C. The principal use of this spectroscope is for the detection, and determination of the percentage saturation, of carbon monoxide in blood. The accuracy that can be attained with the instrument depends primarily upon the precision with which the two alpha bands can be brought into alignment. In the improved apparatus this is enhanced by the bands being elongated and more clearly defined; the scale can be illuminated and is in a position where it can be more easily read. In the essential concomitant examination of normal blood the readings should alternate with those of the specimen, and a shuttle twin cell-holder facilitates this. Other points in technique were discussed. The assembly is mounted complete on a miniature table, so that the spectroscope is at a convenient level for observation.

Dealing with the properties of calciferol, Mr. F. W. Anderson, A.I.C., Mr. A. L. Bacharach, F.I.C., and Dr. E. Lester Smith, F.I.C., gave data for the physico-chemical properties of 73 samples prepared under standardised conditions. It is suggested that the melting point should be described as "unsharp 116° C." Nearly 80 per cent. of the figures for specific absorption in the ultra-violet region fall within the anticipated range based on experimental error, but the figures for optical rotation show unexplained deviations outside the expected range. Nevertheless, all the samples fall well within the range laid down in the 1936 Addendum to the B.P. 1932, and in the joint authors' opinion that range is unnecessarily wide.

Medicine Stamp Duty

Representations to the Chancellor

REPRESENTATIONS to the Chancellor of the Exchequer have been made by the Federation of British Industries in connection with the report of the Select Committee on the Medicine Stamp Duty. The Federation does not agree that medicinal products should be specially selected for taxation, but even if it is impossible to abandon the Medicine Stamp Duty and the present position is not satisfactory, the proposals of the Select Committee would create even more anomalies than they would remove. The Federation urges that the definition of the proposed scope of the tax is vague and inequitable, and the fact that an article is held out as beneficial to or safeguarding health is an unsound criterion of taxability. Such a criterion would render liable to tax many commodities which should be most readily available to consumers in order to improve nutrition and hygiene and would therefore be contrary to public policy.

A strict application of the definition might include a vast range of products which by no stretch of the imagination could be regarded as suitable for a Medicine Stamp Duty. A universal system of stamping each article is unnecessarily expensive, and in some cases quite impracticable, and a system of collection at the source of manufacture should be applied wherever possible. The Federation therefore urges the Chancellor not to adopt the report of the Select Committee.

Professor Kendall in New York

A Talk on Liquids and Solutions

A MEETING of the American Section of the Society of Chemical Industry jointly with the American Chemical Society, was held at the Chemists' Club, New York, on April 9. Mr. James G. Vail was the chairman; the guest speaker was Professor James E. Kendall, on an American tour from Edinburgh, who spoke on "Liquids and Solutions." The Faraday Society held a general discussion on "Structure and Molecular Forces in Liquids and Solutions," at Edinburgh last September when a warm welcome was accorded to Professor Joel H. Hildebrand, of the University of California, around whose work on solubility and internal pressure the second half of the symposium centred.

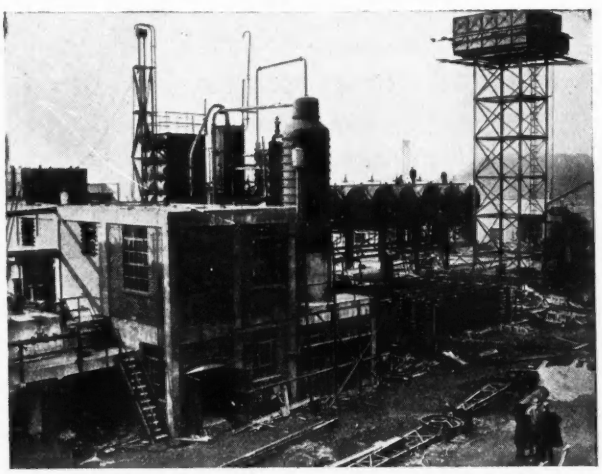
Professor Kendall was the chairman of the sub-committee which arranged the programme. His lecture summarised the more important results of the symposium. The papers presented there on pure liquids included a number which were almost entirely theoretical, delving down to the fundamental nature of the liquid state. Other papers were largely experimental, describing new methods of investigation, such as the examination of liquids by X-rays, Raman and infra-red spectra and the absorption of very high-frequency sound waves. The papers on solutions presented at the symposium covered such diverse topics as laws of solubility, activities, association, the structure of molecular complexes, and refractometric and magnetic data. Just as in the case of pure liquids, it was shown that the basic ideas on molecular interaction which are now taking shape appear to be co-ordinating the most diverse lines of approach and will, in time, lead to a clear conception on the nature of solutions.

Growth of New Fuel Industry

£200,000 for Coal-Oil Extensions at Bolsover

COLONEL W. A. BRISTOW, chairman and managing director of Low Temperature Carbonisation, Ltd., announced important extensions of the new industry of fuel production by low temperature carbonisation of coal on April 14, when the Duke of Kent opened the world's largest plant for making smokeless fuel at Bolsover, near Chesterfield, Derbyshire.

Low Temperature Carbonisation, Ltd., continued Colonel Bristow, was already negotiating for a further supply of coal with a view to increasing the size of the works by 50 per cent. The company was placing contracts for a new coal oil distillation plant, which would be erected alongside at a cost of £200,000. This plant would produce aviation petrol, diesel oil, and a number of other products. With their four large works at present in operation and a fifth works being erected in Wales, they were determined to develop the low temperature carbonisation industry to its fullest possible extent.



The Oil and Petrol Plant in course of erection at the Bolsover Works of Low Temperature Carbonisation Ltd.

The Duke of Kent drove the six miles from Chesterfield to the new works in a car using petrol made from Bolsover coal. Having declared the works open, the Duke closed a switch which raised a wagon tipper and emptied a truck of coal into a conveyor, which carried the coal to the storage bunkers and thence, by way of more conveyors, to the carbonising batteries.

What the Duke Said

In the course of his speech, the Duke said that, soon after the year 1600, coke made from Derbyshire coal by low temperature carbonisation was used in the malting industry. As a result Derbyshire malt and beer became the finest in the country. Derbyshire was now coming to the front again with this works for the scientific utilisation of Derbyshire coal. By providing a first-class smokeless fuel, much will be done to minimise the evils of smoke pollution from which we have suffered for so many years. From a national point of view the new works must also be regarded as a material contribution to the progress of the mining industry and the production of part of our liquid fuel requirements from our own resources.

Amongst those who accepted invitations to be present at the opening ceremony were:—The Mayor and Mayoress of Chesterfield (Councillor G. F. Kirk and Mrs. Kirk), Sir Nigel Campbell (Nuffield Trust), Mr. W. H. Cadman (Anglo-Iranian Oil Co.), Dr. A. E. Dunstan (Anglo-Iranian Oil Co.), Mr. W. R. Gordon (Coal Utilisation Council), Mr. Kenneth Gordon (Imperial Chemical Industries, Ltd.) Dr. J. G. King (Fuel Research Board), Dr. R. Lessing, Sir Gilbert Morgan (director, Chemical Research Laboratory, Teddington), Sir Richard Redmayne (late H.M. Chief Government Inspector of Mines), and Dr. S. F. Sinnatt (director, Fuel Research Board).

Overseas Trade in March

Big Increase in Chemical Exports

THE Board of Trade returns for March reveal an increase of £334,926 in the value of chemicals, drugs, dyes and colours exported from the United Kingdom over the corresponding month of 1936, the total being £2,124,144 against £1,789,218. For the first three months of the year chemical exports amounted to £5,972,289 against £5,178,149 for the corresponding quarter of last year, showing a total increase of £794,140.

Imports of chemical products in March totalled £1,119,313 against £1,148,600 in March of last year, a decrease of £29,287. For the March quarter the total imports were £3,191,801 against £3,057,906, a net increase of £133,905 for the three months.

Our usual analysis of the returns, showing the quantities and values of products exported and imported, is held over until next week.

Indian Chemical Notes

Chemical Manufacture in Karachi

It is understood that the mud from the Karachi harbour will come to be utilised for the production of alkalies. Mr. Grenfield, who has secured the right from the Karachi Port Trust, will soon begin with the installation of a plant, and it is stated that the industry when established will supply cheap and high grade fertilisers. It is keenly felt that India should be using only 40,000 tons of fertilisers annually, while the large majority of her population depends on agriculture. Soda ash will be another product which will be manufactured and which will be useful for the glass industry. Among the by-products may be mentioned caustic soda, chloride for bleaching powder, etc. Along with the carrying out of this heavy chemical industry, it is understood that brick making will also be undertaken by a special process.

Demand for Copper Sulphate

At present no firm in India is manufacturing copper sulphate on a commercial scale. The annual imports into India of this material amount on the average to 1,700 tons, valued at nearly Rs. 450,000. The company proposes to manufacture 600 tons per annum. The raw material will be copper ore from the company's own deposit. This ore has been found to contain on an average over 4 per cent. copper and carried with it 20 oz. of silver and 1/12 oz. of gold to the ton. The advantage of a cheap source of copper which will work out at Rs. 175 per ton of copper in the ore instead of Rs. 700 per ton which is the present price of scrap copper, will give the company a practical monopoly in this product. There will besides be a very handsome profit from the treatment of the residues containing gold and silver, which can, after the manufacture of copper sulphate from the ore, be easily extracted by the well-known cyanide process at a trifling cost.

Chemical Matters in Parliament

Oil Extraction from Coal

IN the House of Commons on April 6 Mr. W. Joseph Stewart asked the Secretary for Mines the total output of oil from coal in this country from low-temperature carbonisation and by hydrogenation, respectively, during the years 1934, 1935, and 1936, and the average cost per gallon?

In reply, the Secretary for Mines (Captain Crookshank) said the production of motor spirit by low temperature carbonisation was nearly 750,000 gallons in each of the years 1934 and 1935. In addition, the production of tar and tar oils amounted to nearly 4,500,000 gallons in 1934 and over 5,000,000 gallons in 1935. Particulars for 1936 are not yet available. There was no production by hydrogenation prior to 1935. The production in that year by the hydrogenation of coal and tar oils (including some low temperature tar) was nearly 21,000,000 gallons of motor spirit and in 1936 rather more than 33,000,000 gallons. No heavy oil was produced. He was not able to supply information as to the cost of these products

The Right Use of Leisure

Lord Leverhulme at the John Benn Hostel

THE tenth anniversary of the John Benn Hostel, Stepney, the memorial to the founder of Benn Brothers, Limited, proprietors of THE CHEMICAL AGE, was celebrated last Saturday. In the afternoon Lord Leverhulme, president of the Society of Chemical Industry, opened an exhibition of arts and crafts, at which examples of wood, leather and metal work, printing and philately, were on view with a number of posters and paintings undertaken by the boys in the Hostel. He referred to the importance of the right use of leisure in the training of character and quoted Pascal's view that "all the evils of the world come from not being able to sit still in a room." This was not to be taken too literally, but the idea behind it was very sound.

In the evening, the celebrations took the form of a "scrapbook, 1927-1937," the history of the Hostel being broadcast through a loud-speaker. Sir Ernest Benn gave a fascinating account of the events leading up to the foundation of the Hostel in 1927. He traced the conception of the Hostel to the day, 76 years ago, when his father, Sir John Benn, first went to work from Stepney Green, and brought the narrative up-to-date with a series of vivacious sketches of the principal events in the Hostel's career during the ten years of its existence. The crowning event of the period had been the opening of a second hostel in Stockwell, known as King George's House, which had been visited by the present King on March 17.

Oil Imports Help Coal

Professor Nash Talks to Rotarians

THAT the increased importation of oil had indirectly arrested the further decline of coal production was the interesting opinion advanced by Professor A. W. Nash, head of the department of oil engineering and refining at Birmingham University, in an address on "Fuel Developments" at Cardiff Rotary Club on Monday. Between 1913 and 1935, he said, the consumption of coal for industrial and domestic purposes in Great Britain declined by 19,500,000 tons, while the present internal consumption of fuel oil was only about 1,500,000 tons per annum, equivalent in heating value to just over 2,000,000 tons of coal. When it was realised that much of this oil was used for industrial purposes for which coal was unsuitable, it was difficult to contend that the coal industry had been seriously menaced by the increased use of fuel oil.

On the contrary the industries which thrived on the use of oil as fuel for the internal combustion engine continued to make large demands on coal in the process of manufacture, and every road vehicle represented a substantial use of coal in the construction of its many parts, while no positive figures were available, it had been estimated that the construction and repair of motor vehicles created a demand for a ton of coal for every ton of petrol consumed by the vehicle. The increased importation of oil, in fact, had saved the coal industry from a worse fate than it had suffered.

Professor Nash dismissed both low temperature carbonisation and hydrogenation as potential sources of fuel. The former process, he said, could not be counted as a source of any magnitude because the oils and tars were merely by-products, while the vast capital outlay required for hydrogenation plant made it prohibitive as an alternative. A plant adequate to produce 150,000 tons of petrol a year cost £5,500,000, while a project to supply the whole of the home demand would involve a capital expenditure of something like £160,000,000. Add to that the £45,000,000 duty at present levied on oil supplies, and hydrogenation ceased to become the attractive proposal that some enthusiasts made it appear.

Finding New Uses for Rubber

First Meeting of Research Board

THE first meeting of the British Rubber Research Board was held on April 8, at the Colonial Office. The board has been set up to take charge of the British Section of the research and development of new uses for rubber contemplated in the international rubber regulation agreement. An international board is shortly to be set up to ensure co-operation with the research organisations in France and Holland.

Lord De La Warr, Parliamentary Under-Secretary for the Colonies, welcomed the board on behalf of Mr. Ormsby-Gore, and emphasised the great importance which their work might have for the future of the rubber industry and of many tropical countries.

The following are members of the board:—Mr. P. J. Burgess, Mr. W. J. Gallagher, Professor W. N. Haworth, professor of chemistry at the University of Birmingham; Mr. H. Eric Miller, chairman of Harrisons and Crosfield, Ltd.; Professor E. K. Rideal, professor of colloid science in the University of Cambridge; and Sir Frank Stockdale, agricultural adviser to the Secretary of State for the Colonies, and chairman, Imperial Institute Advisory Council on Plant and Animal Products. Mr. Burgess and Mr. Gallagher are nominated by the Rubber Growers' Association. The remaining members are nominated by the Secretary for the Colonies on behalf and with the consent of British rubber-producing countries. Mr. Miller was elected chairman and Sir Frank Stockdale vice-chairman of the board.

Magnesium Sulphate in Ceylon

Large Scale Manufacture Possible

THE large scale manufacture of magnesium sulphate and a potash fertiliser for local use is to be undertaken by the Ceylon Salt Department. Investigations carried out in the laboratories of the Imperial Institute last year, on salt products forwarded by the department of the Ceylon Salt Adviser, has led to the discovery of purification methods for both these products. The Salt Department will also undertake the manufacture of refined or table salt, for which it is hoped a foreign market will be available in eastern countries. It is proposed to strengthen the staff of the Salt Department by recruiting the services of a scientific officer, either locally or from abroad, for carrying out the new industrial enterprise.

THAT the growing of linseed, rape, mustard and poppy for oil production would appear to be feasible in the Irish Free State is stated in a report prepared by Professor Joseph Reilly and Mr. Denis F. Kelly, Department of Chemistry, University College, Cork.

Personal Notes

MR. JOHN A. CAMPBELL, manufacturing chemist, Pollokshields, Glasgow, left estate valued at £1,788.

MR. J. E. JAMES, secretary of Imperial Chemical Industries, Ltd., has accepted the invitation of the Minister of Health to serve on the committee which has been formed to advise Government Departments upon the conservation and allocation of water resources and upon any amendments or alterations to the existing law which may be found desirable.

MR. T. A. M. FANCOURT, Melbourne, manager for Dalgety and Co., Ltd., has been appointed to the board of Commonwealth Oil Refineries, Ltd., as one of the representatives of the Anglo-Iranian Oil Co. Mr. Fancourt has lived for the past twelve years in Melbourne, where he is a well-known figure in business circles, and is vice-president of the Melbourne Chamber of Commerce.

MR. CLAUDE T. SYMONDS, who died suddenly at Queen's Hospital, Birmingham, last week, had gone to Birmingham only a few days previously to assist in the founding of the new West Midlands Forensic Science Laboratory, to be accommodated in a building behind the new Coroner's Court, in Newton Street. Mr. Symonds was 58 years of age. He retired in 1934 after eighteen years' service as Government analyst in Ceylon. His connection with the founding of the new forensic science laboratory at Birmingham arose from the fact that he was well known for his scientific researches in police work. In 1935 he was appointed a scientific adviser to the Home Office in connection with the scheme for aiding the work of the police by scientific methods.

PROFESSOR G. G. HENDERSON, of Glasgow, has been awarded the 1937 Medal of the Society of Chemical Industry.

MR. H. H. ROSENTHAL, president of the H. H. Rosenthal Co., Inc., New York, accompanied by Mrs. Rosenthal, is at present in London on the first stage of a two months' tour of England, France, Belgium, Holland and other countries.

MR. R. WADDELL, who was for 18 years general manager of Brown Bayley's Steelworks, Ltd., Sheffield, has joined Campbell and Gifford, consulting engineers, 17 Victoria Street, London.

PROFESSOR SAMUEL SUGDEN has been appointed to the University Chair of Chemistry tenable at University College, London, as from October 1. Since 1928 he has been professor of physical chemistry in the University in respect of the post held by him at Birkbeck College, London.

MR. A. J. BERRY, of Downing College, Cambridge, has been reappointed University Lecturer in the Department of Chemistry as from October 1. Mr. F. P. Bowden, of Gonville and Caius College, has been appointed Humphrey Owen Jones Lecturer in Physical Chemistry for three years from April 1.

MR. H. A. S. GOTHARD has been called out of England on urgent business, and in consequence the joint meeting of the Institution of Chemical Engineers with the Chemical Engineering Group, arranged for April 21, at which his paper on "The Valuation and Insurance of Chemical Plant" was to have been presented, has been cancelled. It is hoped to make arrangements for the paper to be read at a later date.

Chemical Notes from Foreign Sources

Austria

MANUFACTURE of carbon papers and typewriter ribbons will be undertaken by the firm of Vis. L. Gendler.

Manchukuo

ASBESTOS DEPOSITS are being exploited by the Kore Eda Shokai at Kokusekisho, the production (annual average of 1,500 piculs) at present being exported to Japan.

France

THE COMPAGNIE de Produits Chimiques et Electrometallurgiques (Péchiney) announce a net profit for 1936 of 28 million francs (24.5 million in previous year), and is distributing a dividend of 10 per cent. (8 per cent. previous).

Estonia

A DISTILLATION plant for the production of absolute alcohol is being erected at Wesenberg. The machinery is being obtained from France, and when the plant is ready in the autumn it will have a capacity of a million litre per annum.

Japan

ALCOHOL MANUFACTURERS will be carried out in a new factory that the newly-formed Korean Company for Production of Pure Alcohol (Chosen Musui Shusei K.K.) intends to build in Shingishu, using a wood hydrolysis process. The alcohol produced (in an initial annual output of 210,000 gal.) is intended primarily for use as a motor spirit.

Italy

RARE METALS are being produced in Sardinia in a new flotation plant for the treatment of zinc concentrates. Electrolytic treatment results in accumulation in the anodic sludge of indium (0.08 per cent.) germanium (0.06 per cent.) and gallium (0.15 per cent.). The last-named metal is isolated, but experiments are still in progress regarding isolation of the others.

Poland

A WOOD DISTILLATION FACTORY has been established at Garbetce near Radom, which will supply the paper, lacquer, soap and pharmaceutical industries.

Switzerland

NEW company registrations include: Mariza A.-G. Basle, capital 12,000 francs (pharmaceutical and cosmetic products); Ketal A.-G., Chem.-Pharmazeutische Fabrikation, Zurich, capital 20,000 francs (exploitation of discoveries in the fields of medicine, chemistry, etc.); Dichtungs-Fabrik A.-G. Zurich, capital 10,000 francs (chemical packing materials).

Hungary

THE PRESENCE of another vitamin in lemons in addition to vitamin C has been recently established by Professor Szent-Györgyi. Its value in medicine is based upon its powerful action in diminishing the permeability of cell walls to albumen.

Sweden

SELENIUM is manufactured according to Swedish Patent 84,053 by soda treatment of anodic sludge formed during the electrolysis of copper. The resulting selenite or seleniate is taken up with water and the solution (or the residue from evaporation) is mixed with carbon and subjected to fusion. The fused product is dissolved in water, the alkaline selenate decomposed and the selenium precipitated by exposure to air or an oxidising agent.

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ESTERIFICATION.—Esters of sulphurous acid. W. Voss and H. Wulkan, *Ber, 70,* 388-392.

SOAP.—The hydrolysis of sodium soaps in aqueous solutions. B. Lustig and F. Schmerda, *Fette u. Seifen, 44,* 51-54.

VITAMINS.—A synthesis of vitamin C from cane sugar. P. P. T. Sah, *Ber, 70,* 498-499.

COLLOIDS.—Colorimetry with colloidal solutions. R. Juza and R. Langheim, *Angew. Chem., 50,* 255-260.

CELLULOSE.—The action of chemical reagents on cellulose. H. Probosch, *Zent. Papierind., 55,* 75-79.

RUBBER.—Isoprene and rubber: The decomposition of rubber by acids. H. P. Mojen, *Kautschuk, 13,* 39-41.

ACIDS.—On activated oxalic acid. K. Weber and A. Rezek, *Ber., 70,* 407-411.

ORGANIC.—Anthracene, 1,2-dicarboxylic acid anhydride. O. Benndorf, *Monatshefte für Chem., 69,* 420-423.

The application of 2,nitro-indandione 1,3 to the isolation and identification of organic bases. G. Wanag and A. Lode, *Ber., 70,* 547-559.

Oxidation and reduction of the formyl group in chlorophyll. H. Fischer and W. Lautenschlager, *Annalen, 528,* 9-39.

MISCELLANEOUS.—Artificial horn. F. Bonte, *Kunststoffe, 27,* 64-68.

INORGANIC.—Highly purified chromium oxide sol. G. Milazzo and W. Pauli, *Kolloid. Z., 78,* 158-164.

French

SUGARS.—New reagents for the determination of ketoses. E. Votocek and R. Müller, *Coll. Czech. Chem. Commun.,* 1937, No. 2-3, 120-125.

ORGANIC.—Acidic and catalytic dehydration of divinyl glycol. E. Urion and E. Baum, *Compt. rend., 204,* 595-597.

The substitution of fluorine for other halogens using mercury fluoride and iodine: Preparation of methyl fluoride. F. Swarts, *Bull. Soc. Chim. Belg., 46,* 10-12.

CELLULOSE.—Analytical methods for determining the degradation of technical celluloses to be used for nitration and acetylation. L. Brissaud, *Papier, 40,* 133-141.

NITRIDES.—The formation of metallic nitrides by fusion. D. Séférain, *Chim. et Ind., 37,* 426-439

INORGANIC.—The preparation of acid ammonium sulphate for use in analysis. P. Laffitte and P. Locuty, *Annales Chim. analyt., 19,* 61-63.

Phosphorus sulphobromide. A. E. van Arkel and F. J. Leblink, *Rec. Travaux Chim. Pays-Bas., 56,* 208-210.

HYDROLYSIS.—The hydrolysis of the inorganic salts of copper and of copper benzosulphonates. V. Cupr and J. Sirucek, *Coll. Czech. Chem. Commun.,* 1937, No. 2-3, 68-75.

ANALYSIS.—Lithopone and its analysis. G. Bavay, *Rev. Générale Caoutchouc., 14,* 25-27.

A new method for the rapid determination of cobalt in steel. E. Jaboulay, *Rev. Metallurgie, 34,* 166-169.

The calorimetric analysis of organic substances. R. N. M. A. Malotaux and J. Straub, *Rec. Travaux Chim. Pays-Bas, 56,* 263-279.

RESINS.—The mixed phenol-formaldehyde rubber resins. F. Klein, *Rev. Générale Matières Plastiques, 13,* 57-60.

RUBBER.—The fireproofing of rubber. F. Jacobs, *Rev. Générale Caoutchouc, 14,* 12-20.

NITRATION.—The nitration of the paraffin hydrocarbons by means of nitrogen peroxide. T. Urbanski and M. Slon, *Compt. rend., 204,* 870-871.

From Week to Week

BRITISH SUMMER TIME commences to-morrow (Sunday) morning. All clocks should be put forward one hour to-night.

BROWN AND FORTH, LTD., have removed their London offices to Clifton House, 83-117 Euston Road, London. (Telephone: Euston 5101-2-3-4.

THE POLISH ZINC CARTEL, formed in 1934, has been dissolved by the Polish Minister of Industry and Commerce. The cartel comprised four firms.

LISTS OPENED AND CLOSED on April 14, for the issue under the auspices of Ridgeford Trust, of 320,000 shares of 5s. each in Oxley Engineering Co., Ltd., who are in business as engineers to the gas trade, with works at Hunslet, Leeds.

SINCE THE REORGANISATION OF THE CAPITAL the control of Worthington-Simpson, Ltd., had passed into British hands, stated Mr. S. R. Beale, who presided at a meeting of the company on April 9.

A RAYON FACTORY—to be the largest in China—is being erected at Wusih, about 60 miles north-west of Shanghai. The factory, which will have a capital of 4,000,000 Chinese dollars, will be placed under the control of the Ministry of Industries. The daily output is expected to be 3 tons.

NEGOTIATIONS ARE IN AN ADVANCED STAGE for the acquisition by Bowaters of two pulp mills in Umeá, Sweden, owned by Aktiebolaget Scharins and Sons. These mills have an annual production capacity of about 130,000 tons of wet pulp. The purchase price is believed to be between five and six million kronor.

A REPRESENTATION HAS BEEN MADE to the Board of Trade under Section 10(5) of the Finance Act, 1926, for the exemption of copper oxychloride (basic copper chloride) from Key Industry Duty. Any communications should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, not later than May 12.

ANOTHER SCOTTISH DISTILLERY—the Clynelish—in Sutherlandshire, which has been closed for six years, is to be reopened for next season. All the distilleries in the North of Scotland will continue distilling operations for a longer seasonal period than for many years, and the time they will remain closed for repairs will be considerably shorter than usual.

THE 27TH ANNUAL MAY LECTURE of the Institute of Metals will be delivered by Professor E. N. da C. Andrade, D.Sc., Ph.D., F.R.S., on Wednesday, May 5, at 8 p.m., in the Hall of the Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W.1. Tickets of admission can be obtained from Mr. G. Shaw Scott, 36 Victoria Street, London, S.W.1. The subject of the lecture will be "The Flow of Metals."

IN CONNECTION WITH THE PROPOSED PURCHASE of shares in the Anglo-Continental Guano Works, Ltd., by Fison, Packard and Prentice, Ltd., it is announced that holders of over 88 per cent. of the ordinary shares have now ratified the provisional agreement, and it has therefore been decided to proceed with the purchase. More than double the number of preference shareholders have tendered their shares.

A DEMONSTRATION OF HEAT-TREATMENT PLANT as supplied by Wild-Barfield Electric Furnaces, Ltd., is being held at Carliol House, Newcastle-upon-Tyne, in co-operation with the North-Eastern Electric Supply Co., Ltd. The demonstration opened on Wednesday, and closes on April 23. The pyrometer equipment is being exhibited by the Foster Instrument Co., Ltd.

THE LECTURE on "Gas Defence from the Point of View of the Chemist," which Mr. J. Davidson Pratt delivered before the London Section of the Institute of Chemistry on January 20 and before the Glasgow Section on January 22, and Mr. S. Glasstone's lecture on "Oxidation-Reduction Potentials and their Application," delivered before the London Section of the Institute on March 18, 1936, and before the East Midlands Section on March 4, 1937, have been published in booklet form by the Institute.

THE ANGLO-AMERICAN OIL CO., LTD., has decided on a spot one mile north-east of Hellingly, Sussex, for its first test well in England. Borings will be made, probably to a depth of 4,000 feet, at Grove Hill, where geologists have found conditions under which oil or gas may have accumulated. Drilling will be started early in May and will continue for four to six months. The primary objective is crude petroleum, but exhaustive tests will be carried out to try to find the main source of the small gas indications discovered some years ago at Heathfield.

DELEGATES from many Continental countries are to attend the sixth international Road Tar Conference to be held at Prague on May 24. At these annual conferences many aspects of the tar treatment of roads are given detailed study. The meetings form a valuable medium for the exchange of information between the leading technicians of the various countries. A paper on the study of thin tar carpets will be read by Mr. W. E. Cone, technical adviser of the British Road Tar Association, who is one of the British delegates.

THE PREMISES of Sadler and Co., soap and oil manufacturers, and of George Walker, chemist, were seriously damaged by fire, which destroyed a three-storey building in Colvend Street, Glasgow, on Tuesday.

EASTWOOD DYEWORKS, Todmorden, a branch of the English Velvet and Cord Dyers' Association, closed down on Thursday. Nearly 40 workpeople were affected. Up to a few years ago the concern was run by D. Crabtree and Sons, Ltd.

AN ANONYMOUS DONOR has given £2,000 to Birmingham University to enable an investigation to be carried out under Professor W. N. Haworth, with the object of producing an improved form of insulin for use in the treatment of diabetes. Two research fellows are already at work on this subject.

THE NATIONAL UNION of Distributive and Allied Workers has negotiated an agreement on behalf of the 80 operatives employed by Raimes Clark, Ltd., manufacturing chemists, Leith. Women assistants secure an average increase of 8s. a week. The male workers are advanced 6s. to 15s. a week. Extended holidays with payment are included in the new terms.

THE "FREE MARKET" FOR SUGAR can be reckoned at a total of 3,170,000 metric tons in the crop year 1936-37, according to a statement made at the meeting of the International Sugar Conference on April 7. The "free market" is that part of total world consumption which is not met by home production or by the production of colonies enjoying preferential treatment, and has therefore to be supplied by exports. British consumption accounts for the largest part.

New Companies Registered

André Aune (London), Ltd., 17 Philpot Lane, E.C.3.—Registered March 25. Nominal capital £1,000. Brokers of and dealers in oil seeds, essential oils, copra, margarine, glycerine and chemicals of all kinds, etc. Directors: John W. Fall and A. Aune.

Trupha, Ltd., 5 Emmott Street, E.1.—Registered April 5. Nominal capital £100. Producers and manufacturers of and dealers in chemicals, minerals, essential oils, fruits and vegetable gums, etc. Subscribers: Ephraim Schocher and C. Schneidler.

United Compositions, Ltd., 108 Douglas Street, Glasgow, C.2.—Nominal capital £2,000. Metallurgists, chemists, manufacturers of and dealers in metals, chemicals, etc. Directors: Henry B. Russell and C. N. Exley.

Colne Vale Dye & Chemical Co., Ltd., Colne Vale Dye Works, Milnsbridge, Huddersfield.—Registered April 2. Nominal capital £40,000. To acquire the undertaking of the Colne Vale Dye and Chemical Co., Ltd. (incorporated in 1899). Directors: Wm. F. Clayton and J. W. Lunn.

Essex Refineries, Ltd., 242 Sebert Road, Forest Gate, E.7.—Registered March 15. Nominal capital £500. Manufacturing chemists and druggists, distillers of essences and oils, bakers' sundriesmen, oil brokers, etc. Directors: William Faupel and W. J. Faupel.

R. Greenberg, Ltd., 190 High Street, Walthamstow, E.17.—Registered March 17. Nominal capital £500. Manufacturing chemists, manufacturers of and wholesale and retail dealers in perfumery, cosmetics, creams, soaps, scent, dyes, etc. Directors: Rebecca Greenberg, and Rose Greenberg.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

British India.—The Director General, India Store Department, Belvedere Road, Lambeth, London, S.E.1, invites tenders for 1,800 tons bitumen and 1,500 tons cut black bitumen. Samples required with tender. Tenders due April 30. Forms of tender obtainable from the above at a fee (which will not be returned) of 5s.

Belgium.—A firm manufacturing chemical products established at Brussels wish to obtain the representation, on terms to be arranged, of United Kingdom manufacturers of cellulose, enamel, varnish, synthetic paints, primers, lacquers, polishers, sandpapers, etc. (Ref. No. 67.)

Egypt.—H.M. Consul-General at Alexandria reports that the Alexandria Municipality is calling for tenders (Contract No. 1379) for the supply and delivery of quantities of paints, varnishes, enamels, oils, barytes, calcium carbonate, washing soda, putty, white lead-powder, white and coloured cotton waste, etc. Tenders endorsed "Oils and Paints," should be addressed to the Director-General, Alexandria Municipality, Alexandria, Egypt, by whom they will be received up to noon on April 21, 1937. (Ref. T. 179.)

Inventions in the Chemical Industry

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Open to Public Inspection

DYEING FIBROUS MATERIALS WITH VAT DYESTUFFS.—N. V. Carp's Garenfabrieken. Oct. 2, 1935. 31763/35.

MANUFACTURE OF NEW ESTERS of polynuclear cyclic oxyketones. Soc. of Chemical Industry in Basle. Oct. 5, 1935. 25317/36.

DETERGENT COMPOSITIONS and process of applying the same.—Rumford Chemical Works. Oct. 5, 1935. 25413-4/36.

MANUFACTURE OF DYESTUFFS.—I. G. Farbenindustrie. Oct. 4, 1935. 25839/36.

PROCESS FOR PREPARING FRACTIONS with a melting point lower than that of paraffin wax from liquid hydrocarbon mixtures.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Oct. 3, 1935. 26319/36.

PETROLEUM PRODUCTS AND METHOD FOR MAKING SAME.—Socony-Vacuum Oil Co., Inc. Oct. 3, 1935. 26397/36.

STABILISING OF CELLULOSE ESTERS.—N.V. Gevaert Photo-Production. Oct. 2, 1935. 26671/36.

PROCESS FOR THE MANUFACTURE OF AMIDE-LIKE CONDENSATION PRODUCTS of aromatic sulphonic acids.—I. G. Farbenindustrie. Oct. 5, 1935. 26890/36.

Specifications Accepted with Date of Application

MANUFACTURE OF WATER-INSOLUBLE AZO DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) Sept. 20, 1935. 463,062.

MANUFACTURE OF DYESTUFFS and intermediate products therefor.—Soc. of Chemical Industry in Basle. Sept. 29, 1934. 462,913.

TAR AND LIKE HYDROCARBON MATERIALS FOR ROAD-SURFACING.—Soc. Du Gaz de Paris. Oct. 30, 1934. 463,065.

MANUFACTURE AND PRODUCTION OF METAL CARBONYLS practically free from sulphur.—G. W. Johnson (I. G. Farbenindustrie.) Sept. 26, 1935. 463,116.

RECOVERY OF SULPHUR.—R. F. Bacon. Oct. 18, 1934. 463,122.

PURIFICATION OF RUBBER.—Rubber Producers' Research Association, H. P. Stevens, and J. W. W. Dyer. Oct. 17, 1935. 462,840.

INSULATING COMPOSITIONS.—G. W. Johnson (I. G. Farbenindustrie.) Oct. 29, 1935. 463,085.

PRODUCTION OF TITANIUM DIOXIDE.—W. J. Tennant (Titan Co., Inc.). Oct. 30, 1935. 462,998.

PREPARATION OF SOLUBLE AROMATIC AMIDO COMPOUNDS of therapeutic value.—G. B. Ellis (Soc. des Usines Chimiques Rhône-Poulenc). Jan. 3, 1936. 462,765.

MANUFACTURE AND PRODUCTION OF CRYOLITE.—G. W. Johnson (I. G. Farbenindustrie.) Jan. 6, 1936. 463,092.

PURIFYING MASSES FOR USE IN THE PURIFICATION OF GASES.—M. F. Bertrand. Mar. 21, 1936. 462,934.

COMPOSITIONS FROM COAL TAR AND HIGHER FATTY-ACID CHLORIDES and process of making the same.—Armour and Co. July 1, 1935. 463,014.

MANUFACTURE OF MONOAZO DYESTUFFS.—I. G. Farbennidustrie. May 9, 1935. 462,940.

MANUFACTURE AND TREATMENT OF ARTICLES CONTAINING CELLULOSE DERIVATIVES.—Celluloid Corporation. May 8, 1935. 462,791.

PROCESS FOR THE MANUFACTURE OF LUBRICANTS and insulating oils.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. June 1, 1935. 462,793.

PROCESS FOR THE MANUFACTURE OF AN ORGANIC MERCURY COMPOUND.—E. Scheitlin. Jan. 7, 1936. 462,949.

MANUFACTURE OF AMINE OXIDES.—Soc. of Chemical Industry in Basle. July 6, 1935. 462,881.

ELECTROLYTIC PRODUCTION OF PROTECTIVE LAYERS ON MAGNESIUM and magnesium-base alloys.—I. G. Farbenindustrie. July 27, 1935. 463,024.

STERILISATION OF WATER BY MEANS OF CHLORAMINE.—United Water Softeners, Ltd. Nov. 2, 1935. 462,890.

MANUFACTURE OF QUATERNARY AMMONIUM COMPOUNDS.—W. W. Groves (I. G. Farbenindustrie.) Sept. 10, 1935. 462,967.

MANUFACTURE OF PRODUCTS ESPECIALLY SUITABLE FOR USE AS VERMIN-DESTROYING AND INSECTICIDAL AGENTS.—F. B. Dehn. June 28, 1935. 463,544.

PRODUCTION AND RECOVERY OF LIGHT HYDROCARBONS FROM GAS MIXTURES produced in the heat treatment of carbonaceous materials at elevated temperatures.—G. W. Johnson (I. G. Farbenindustrie.) July 22, 1935. 463,333.

MANUFACTURE AND PRODUCTION OF WASHING, CLEANSING, DISPERSING, SOLVENT, and like agents.—G. W. Johnson (I. G. Farbenindustrie.) Aug. 2, 1935. 463,624.

LUBRICATION AND/OR TINTING OF TEXTILE MATERIALS.—British Celanese, Ltd., E. Stanley, H. C. Olpin, and R. H. J. Riley. Sept. 24, 1935. 463,548.

MANUFACTURE OF AROMATIC COMPOUNDS containing fluorine in a side chain.—W. W. Groves (I. G. Farbenindustrie.) Sept. 26, 1935. 463,420.

MANUFACTURE OF CARBONATE OF MAGNESIA.—G. Antonoff. Sept. 26, 1935. 463,551.

HARDENING GELATINE especially in photographic emulsions.—Kodak, Ltd. Sept. 27, 1934. 463,427.

MANUFACTURE OF POLYCYCLIC COMPOUNDS FROM CHRYSENE.—I. G. Farbenindustrie. Sept. 27, 1934. 463,428.

MANUFACTURE OF GELATINE AND GLUE.—J. V. S. Glass, B. W. Hirsh, and Imperial Chemical Industries, Ltd. Sept. 27, 1935. 463,432.

MANUFACTURE OF ARTIFICIAL RESINS.—Imperial Chemical Industries, Ltd. Sept. 29, 1934. 463,433.

WOOD PULP ADAPTED FOR CHEMICAL USE.—Hercules Powder Co. Dec. 28, 1934. 463,437.

RECOVERY OF SULPHUR.—R. F. Bacon. Oct. 18, 1934. 463,438.

FORMATION OF STAPLE PRODUCTS FROM CONTINUOUS FILAMENTS, and the use of such products.—British Celanese, Ltd., and H. Dreyfus. Sept. 30, 1935. (Addition to 424,830.) 463,485.

MANUFACTURE OF TRIFLUOROMETHYLARYLSULPHONIC ACIDS.—W. W. Groves (I. G. Farbenindustrie.) Oct. 1, 1935. 463,559.

MANUFACTURE OF METALLIFEROUS AZO-DYESTUFFS.—I. G. Farbenindustrie. Jan. 31, 1935. (Addition to 35829/34.) 463,645.

MANUFACTURE OF CONDENSATION PRODUCTS from oxy- and amino-derivatives of pyrene and chrysene.—I. G. Farbenindustrie. Nov. 9, 1934. 463,646.

PROCESS FOR THE MANUFACTURE OF COMPLEX COMPOUNDS of 1.3-dimethylxanthine.—I. G. Farbenindustrie. Oct. 4, 1934. 463,647.

PROCESS FOR THE MANUFACTURE OF A VITAMIN PREPARATION.—A. Carpmael (I. G. Farbenindustrie.) Oct. 4, 1935. 463,698.

PROCESS FOR THE MANUFACTURE OF AZO DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie.) Oct. 5, 1935. 463,669.

MANUFACTURE AND PRODUCTION OF UNSATURATED HYDROCARBONS. G. W. Johnson (I. G. Farbenindustrie.) Oct. 7, 1935. 463,569.

MANUFACTURE AND PRODUCTION OF COMPOUNDS OF THE AZAPHENANTHRENE SERIES.—G. W. Johnson (I. G. Farbenindustrie.) Dec. 5, 1935. 463,456.

TREATMENT OF PAPER MILL and similar wastes.—J. Dickinson and Co., Ltd., J. Grant, Dorr-Oliver Co., Ltd., R. F. Stewart and P. Evans. Dec. 18, 1935. (Addition to 434,225.) 463,458.

CONDENSER FOR ACETIC ACID FUMES rising from acetifiers.—M. Williams. March 25, 1936. 463,350.

MANUFACTURE OF STABILISED DIAZO COMPOUNDS.—J. S. Heaton. May 2, 1936. 463,515.

MANUFACTURE OF OXYGENATED ORGANIC COMPOUNDS.—British Celanese, Ltd. Nov. 19, 1935. 463,389.

Applications for Patents

MANUFACTURE OF MOULDED PRODUCTS FROM RAW LIGNO-CELLULOSE.—W. W. Triggs (Masonite Corporation). 7651.

SEPARATION BY GRAVITY OF MERCURY from finely-ground substances, etc.—White, Hugues, and Co., Ltd., and R. A. White. 7793.

PREPARING METAL SULPHHYDRYL COMPOUNDS FROM KERATIN DEGRADATION PRODUCTS.—J. A. Wülfing (firm of), E. Rosskothen, R. Fleischmann, E. Sturm, and R. Von Wülfing. 7882.

PRODUCTION OF MOULDABLE PROTEIN PLASTICS.—J. E. Pollak (International Patents Development Co.). 8003.

CATALYTIC HYDROGENATION OF ORGANIC SUBSTANCES.—H. E. Potts (International Hydrogenation Patents Co., Ltd.). 8084.

SOLIDIFICATION, ETC., OF ORGANIC LIQUIDS.—Röhm and Haas, A.-G. (Germany, March 19, '36.) 8167.

MANUFACTURE OF DERIVATIVES OF 2.6-DIHYDROXPYRIDINE-4-CARBOXYLIC ACID.—Schering-Kahlbaum, A.-G. (Germany, March 23, '36.) 8356.

DESTROYING TOBACCO PESTS BL CHLOROPICRIN.—M. Schoene (née Mokrzecka). (Poland, March 21, '36.) 8339.

PRODUCTION OF TANTALUM AND NIOBIUM CARBIDES.—W. W. Triggs (Soc. Generale Metallurgique de Hoboken). 8103.

TREATMENT OF MATERIAL CONTAINING TANTALUM AND NIOBIUM CARBIDES.—W. W. Triggs (Soc. Generale Metallurgique de Hoboken). 8104, 8105, 8106.

MATERIALS CONTAINING TANTALUM, ETC.—W. W. Triggs (Soc. Generale Metallurgique de Hoboken). 8331.

TREATMENT OF MATERIALS CONTAINING TANTALUM, ETC.—W. W. Triggs (Soc. Generale Metallurgique de Hoboken). 8332, 8489, 8490.

TREATMENT OF SUBSTANCES CONTAINING TANTALUM, ETC.—W. W. Triggs (Soc. Generale Metallurgique de Hoboken). 8333.

MANUFACTURE OF ARTIFICIAL SILK.—Vereinigte Glanzstoff-Fabriken, A.-G. (Germany, March 23, '36.) 8550.

LOW-TEMPERATURE CARBONISATION.—C. H. Verity. 7912.

MANUFACTURE OF SAFETY GLASS.—E. W. Aldridge, and D. C. Polden. 9224.

COATING GLASS SHEETS with polymerised vinyl compounds.—E. W. Aldridge. 9225.

MANUFACTURE OF ARTIFICIAL SILK.—J. P. Bemberg, A.-G. (Germany, April 4, '36.) 9217.

MANUFACTURE OF ARTIFICIAL SILK.—J. P. Bemberg, A.-G. (Germany, Oct. 3, '36.) (Cognate with 9217.) 9218.

PRODUCTION OF ALKYLAMINES.—Boot's Pure Drug Co., Ltd., H. H. L. Levene, and F. L. Pyman. 8715.

MANUFACTURE OF THERAPEUTIC SUBSTANCES.—Boots Pure Drug Co., Ltd., H. A. Stevenson, and F. L. Pyman. 8905.

SYNTHETIC RESINS.—British Thomson-Houston Co., Ltd. (United States, April 1, '36.) 9190.

REDUCTION OF METAL OXIDES.—Calloy, Ltd. 8816.

MANUFACTURE OF DIAZOTISING DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie.) 9051.

PRODUCTION OF MONOAZO DYESTUFFS.—Chemical Works formerly Sandoz. (Switzerland, March 31, '36.) 9208.

PRODUCTION OF MONOAZO DYESTUFFS.—Chemical Works formerly Sandoz. (Switzerland, March 18.) (Cognate with 9208.) 9209.

TREATMENT OF FLUIDS WITH GASES.—C. V. Child (Legal representative of R. O. Child.) 8595.

DETERGENTS.—Colgate-Palmolive-Peet Co. (United States, April 29, '36.) 9191.

COMPOSITION FOR TREATING SHEEP to prevent attack by insects. T. R. Collinson. 9109.

MANUFACTURE, ETC., OF CELLULOSIC MATERIALS with crease-resisting properties.—Courtaulds, Ltd., T. H. Morton, and J. Boulton. 8686.

MANUFACTURE OF ALKALI CELLULOSE.—Courtaulds, Ltd., W. H. Stokes, and E. A. Morton. 9198, 9199.

UTILISATION OF WASTE SULPHURIC-ACID IRON PICKLE.—A. J. Evans. 8976.

PRODUCTION OF NITROGEN, ETC.—Expanded Rubber Co., Ltd., and F. de Lautour. 1978.

TRANSLUCENT REFRACTORY MATERIALS.—General Electric Co., Ltd., and M. Pirani. 9157.

APPARATUS FOR DECOMPOSITION OF GASEOUS MIXTURES by liquefaction and rectification.—Ges. für Linde's Eismaschinen, A.-G. (Germany, May 19, '36.) 8869.

APPARATUS FOR DECOMPOSITION OF GASEOUS MIXTURES by liquefaction and rectifications.—Ges. für Linde's Eismaschinen, A.-G. (Germany, July 29, '36.) (Cognate with 8869.) 8870.

COMBATING PESTS.—W. W. Groves (I. G. Farbenindustrie.) 8655.

MANUFACTURE OF VAT-DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie.) 8656, 9149.

MANUFACTURE OF AZO DYESTUFFS soluble in water.—W. W. Groves (I. G. Farbenindustrie.) 9034.

MANUFACTURE OF AROMATIC CARBOXYLIC ACIDS, ETC.—W. W. Groves (I. G. Farbenindustrie.) 9147.

MANUFACTURE OF SULPHONATION PRODUCTS.—W. W. Groves (I. G. Farbenindustrie.) 9148.

MANUFACTURE OF KETONES OF THE STEROL SERIES.—I. G. Farbenindustrie. (Germany, March 28, '36.) 8657.

MANUFACTURE, ETC., OF TERTIARY ALIPHATIC AMINES.—I. G. Farbenindustrie. 8684.

MANUFACTURE, ETC., OF AMINO-AZA-PHENANTHRENES.—I. G. Farbenindustrie. 8685.

ELECTROLYTIC CELL FOR PRODUCTION OF CAUSTIC ALKALIS and chlorine.—I. G. Farbenindustrie. (Germany, July 4, '36.) 8817.

MANUFACTURE OF β-HALOGEN-BUTADIENES-1, 3.—I. G. Farbenindustrie. (Germany, March 28, '36.) 8820.

MANUFACTURE OF CARBOXYLIC ACIDS OF THE HYDROAROMATIC SERIES.—I. G. Farbenindustrie. (Germany, March 28, '36.) 9032.

FILMS, ETC., MADE BY HARDENING PROTEINS, ETC.—Imperial Chemical Industries, Ltd., and D. Traill. 8725, 8726.

ANTHRAQUINONE DYESTUFFS.—Imperial Chemical Industries, Ltd., and F. Lodge. 8917.

MANUFACTURE OF ANTHRAQUINONE DERIVATIVES.—Imperial Chemical Industries, Ltd. (United States, March 25, '36.) 8918.

MANUFACTURE OF FILAMENTS, ETC., OF CELLULOSE ESTERS, ETC.—Imperial Chemical Industries, Ltd., A. Shepherdson, and J. G. Evans. 9213.

MANUFACTURE, ETC., OF AMINO-AZA-PHENANTHRENES.—G. W. Johnson. 8685.

STABILISATION OF POLY-ISOBUTYLENE.—G. W. Johnson (I. G. Farbenindustrie.) (Sept. 28, '36.) 8596.

APPARATUS FOR CARRYING OUT POLYMERISATIONS CONTINUOUSLY. G. W. Johnson. 8833.

MANUFACTURE, ETC., OF CONCENTRATED NITRIC ACID and ammonium sulphate.—G. W. Johnson. 9056.

TREATMENT OF FIBROUS MATERIALS.—G. W. Johnson. 9057.

MANUFACTURE, ETC., OF AZO DYESTUFFS containing metal.—G. W. Johnson. 9058.

MANUFACTURING AN ACTIVE DRY PREPARATION OF PAPAINE, ETC.—A. Klotz. 8663.

ARTICLES FOR HOLDING CERAMIC GOODS DURING FIRING.—C. McNeal. 8953.

PURIFICATION OF COAL GAS.—E. B. Maxted. 9107.

CONVERSION OF OLEFIN HYDROCARBONS.—A. L. Mond (Universal Oil Products Co.). 8911, 8912.

PRESERVATION OF RUBBER.—Monsanto Chemical Co. (United States, April 3, '36.) 9096.

PRODUCTION OF RESINOUS COMPOSITIONS.—Naamlooze Vennootschap Industrieele Maatschappij voorheen Noury and Van der Lande. (United States, March 27, '36.) 8734.

MANUFACTURE OF RESINOUS COMPOSITIONS.—Naamlooze Vennootschap Industrieele Maatschappij voorheen Noury and Van der Lande. (United States, March 27, '36.) 8735.

MANUFACTURE OF ARTICLES OF CELLULOSE with metal, etc., cores. C. J. Nurse. 8597.

PRODUCTION OF WATER-GAS.—Power-Gas Corporation, Ltd., N. E. Rambush, and A. T. Grisenthwaite. 8970.

APPARATUS FOR DEODORISING AND REMOVING DUST FROM GASES from furnaces.—Raffinerie Tirlemontoise Soc. Anon. (Belgium, April 10, '36.) 8658.

DETERGENTS.—I. Reichstein. (Switzerland, March 27, '36.) 8712.

CARBURISING-COMPOUNDS.—Rodman Chemical Co. (United States, May 1, '36.) 9047.

TREATMENT OF SYNTHETIC RESINS and materials containing same. M. van Roggen, and L. Robin. (Belgium, April 1, '36.) 8826.

PURIFICATION OF GASES.—A. Ryner. 8848.

Chemical and Allied Stocks and Shares

SENTIMENT in the stock and share markets has been affected by the absence of an early recovery in base metal and commodity prices from their recent sharp decline. As there has been an increasing tendency to await the Budget a falling off in business in industrial shares has been in evidence, and at the time of writing the general trend remains uncertain.

Bearing in mind surrounding market conditions, shares of companies operating in the chemical and associated industries have made a relatively satisfactory showing, but the tendency has been to lower prices. Imperial Chemical have lost 6d. to 37s. 9d. at which an apparently satisfactory yield is offered on the basis of last year's conservative dividend of 8 per cent. The forthcoming meeting of the company is awaited with a good deal of interest in the market in view of the review of prospects usually contained in the chairman's speech. Unilever have declined moderately to 40s. 6d. pending the results and more particularly the meeting where it has been stated officially an outline of proposals for consolidating the companies in the group will be forthcoming.

British Drug Houses have made the better price of 21s. 9d. on the increased profits shown by the full report. United Premier Oil and Cake were lower at 9s. 9d. in view of the lower earnings for the past year and the reference in the report to the effects of increased costs. British Oil and Cake Mills preferred ordinary were lower at 45s. 6d., at which on the basis of their 12½ per cent. dividend an apparently generous yield is offered. Greeff Chemicals Holdings shares, which were issued at 7s. 6d. last year, have been steady at 9s. 10½d. British Industrial Plastics were active around 3s. 1½d. and British Glues kept at 9s. 9d. Monsanto Chemicals 5½ per cent. preference were maintained at 22s. 6d. Imperial Smelting have reacted from 21s. 10½d. to 19s 9d. in sympathy with the price of zinc.

Turner and Newall at 101s. 9d. are within 1s. 6d. of the price current a week ago, but the general assumption in the market is that a further increase in dividend is likely and that the interim dividend may be raised. United Molasses is another share which was assisted later by hopes of an increase in the forthcoming interim payment, but although again very active, the price of these shares has on the week reacted 2s. to 32s. B. Laporte continued to be held firmly, and the list price has remained at 125s. "middle." General Refractories are 29s. 9d., against 31s. 3d. a week ago, but are now "ex rights" to the new issue of shares. Murex were aided by the larger interim dividend, but British Oxygen were reactionary although the market is anticipating that the forthcoming results will either show a larger dividend or proposals for offering shareholders additional shares.

Amalgamated Metal shares were not affected by the results showing increased profits (the larger dividend had been announced previously), but Metal Traders were active on attention drawn to the good yield offered, and the apparently satisfactory prospects of the distribution being maintained. Cellon were firm on the increase in dividend. Pinchin Johnson and other paint shares were fairly steady, and there was activity reported in the shares of Wailes Dove Bitumastic in which dealings started a short time ago.

Leading oil shares have declined on balance for the week, but this is generally attributed to the influence of surrounding market conditions as the view persists that the impending dividend announcements are likely to create a favourable impression.

Weekly Prices of British Chemical Products

THERE are no price changes to report in the London market for general heavy chemicals, rubber chemicals, wood distillation products, perfumery chemicals, essential oils or intermediates. There has been a slight advance in the prices of carbolic acid and cresylic acid. Citrates all advanced one penny per lb.; potassium citrate is quoted at 1s. 6d. to 2s. 1d., sodium citrate at 1s. 7d. to 2s. 2d., and iron ammonium citrate at 1s. 10d. to 2s. 5d.

MANCHESTER.—Quotations for the lead, copper and other non-ferrous metal compounds on the Manchester market during the past week have further given way as a result of the weakness in the metal markets, but in most other respects chemical prices have maintained a steady front. A moderate amount of new business has been placed on this centre since last report, including some additional contract bookings. The leading heavy products, including the alkalis, potash and magnesium materials, continue to be called for in fairly satisfactory quantities against commitments, with the cotton and woollen textile industries in Lancashire and the West Riding responsible for a steady movement into consumption. In the by-products market firmness is a feature of virtually every section and a steady trade has been reported during the past week.

GLASGOW.—Business is slightly improving in the Scottish heavy chemical market. There has been a good demand for chemicals for home trade during the week, but export business has been rather quiet. Prices of general chemicals continue very firm with an advancing tendency, but lead and copper products are cheaper on account of the lower values of the metals. General conditions on the coal tar products market continue firm. Manufacturers are active in most departments and materials are moving steadily into buyers' hands. Fresh business transactions, however, have not been so numerous, possibly on account of the fully committed position of most producers in certain products. Cresylic acid is practically unobtainable for prompt delivery, and still higher prices are being quoted for 97/99 and American specification. Further carbolic parcels have been on offer around 4s. to 4s. 3d. per gallon (distilled 60's). Pyridines, naphthalene and solvent naphthas are very steady. Fresh inquiries for prompt supplies of pitch have been a welcome feature among the heavier by-products.

General Chemicals

ACETONE.—£45 to £47 per ton.

ACID, ACETIC.—Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £30 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

ACID, CHROMIC.—9½d. per lb., less 2½%; d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 1s. SCOTLAND: B.P. crystals, 1s. per lb., less 5%, ex store.

ACID, FORMIC.—85%, in carboys, ton lots, £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 5s. to 7s. 6d. carboy d/d according to purity, strength and locality.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50: pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works.

ACID, OXALIC.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

ACID, SULPHURIC.—168° Tw., £4 5s. to £4 15s. per ton; 140° Tw., arsenic-free, £2 15s. to £3 5s.; 140° Tw., arsenious, £2 10s.

ACID, TARTARIC.—1s. 1¼d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1d. to 1. 1½d. per lb.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 per ton d/d Lancs.; GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £16 10s. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—£55 10s. per ton.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 ex store. MANCHESTER: White powdered Cornish, £17, ex store.

BARIUM CHLORIDE.—£10 per ton. GLASGOW: £11 5s. per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%. £8 15s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. GLASGOW: 70/75% solid, £5 10s. per ton net ex store.

CHROMETAN.—Crystals, 2¾d. per lb.; liquor, £19 10s. per ton d/d

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. GLASGOW: 99%, £4 7s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£22 10s. per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £5 7s. 6d. to £6 7s. 6d. per cwt. according to quantity; in drums, £5 to £5 13s. 6d.

IODINE.—Resublimed B.P., 5s. 1d. per lb.

LEAD ACETATE.—LONDON: White, £35 10s. per ton; brown, £35. GLASGOW: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £37; brown, £36 10s.

LEAD NITRATE.—£39 per ton.

LEAD, RED.—SCOTLAND: £40 10s. per ton, less 2½%, carriage paid for 2-ton lots.

LEAD (WHITE SUGAR OF).—GLASGOW: £39 per ton net, ex store.

LITHARGE.—SCOTLAND: Ground, £40 10s. per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 10s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 11d. per lb.; powder B.P., 6s. 1d.; bichloride B.P. (corros. sub.) 5s. 2d.; powder B.P. 4s. 10d.; chloride B.P. (calomel), 5s. 11d.; red oxide cryst. (red precip.), 7s.; levig. 6s. 6d.; yellow oxide B.P. 6s. 4d.; persulphate white B.P.C., 6s. 1d.; sulphide black (hyd. sulph. cum sulph. 50%), 6s. For quantities under 112 lb., 1d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3⅜d. per lb.

PHENOL.—6¾d. to 7¼d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39.

POTASSIUM BICHROMATE.—SCOTLAND: 5d. per lb., less 5%, carriage paid.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4¼d. per lb. MANCHESTER: £38 per ton.

POTASSIUM IODIDE.—B.P. 4s. 3d. per lb.

POTASSIUM NITRATE.—£27 per ton. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 11d. to 1s.

POTASSIUM PRUSSATE.—6¼d. per lb. SCOTLAND: 7d. net, in casks, ex store. MANCHESTER: Yellow, 6¼d. to 6¾d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. GLASGOW: Large crystals, in casks, £38.

SALT CAKE.—Unground, spot, £3 16s. 6d. per ton.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £12 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£18 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. GLASGOW: £12 15s. per ton in 1 cwt. kegs, £11 per ton in 2-cwt. bags. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. MANCHESTER: 4d. per lb. GLASGOW: 4d., less 5% carriage paid.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£26 10s. to £30 per ton. GLASGOW: £1 10s. per cwt.

Sodium Chromate.—4d. per lb. d/d U.K.
Sodium Hyposulphate.—Commercial, 2 ton lots d/d, £10 5s. per ton; photographic, £14 5s. Manchester: Commercial, £10; photographic, £14 10s.
Sodium Metasilicate.—£14 per ton, d/d U.K. in cwt. bags.
Sodium Nitrate.—Refined, £7 15s. per ton for 6-ton lots d/d.
Sodium Nitrite.—£18 5s. per ton for ton lots.
Sodium Perborate.—10%, 9¼d. per lb. d/d in 1-cwt. drums.
Sodium Phosphate.—£13 per ton.
Sodium Prussiate.—4d. per lb. for ton lots. Glasgow: 5d. to 5¾d. ex store. Manchester: 4¼d. to 4½d.
Sodium Silicate.—£9 10s. per ton.
Sodium Sulphate (Glauber Salts).—£3 per ton d/d.
Sodium Sulphate (Salt Cake).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. Scotland: Ground quality, £3 5s. per ton d/d. Manchester: £3 10s.
Sodium Sulphide.—Solid 60/62%, Spot, £11 5s. per ton d/d in drums; crystals 30/32%, £8 15s. per ton d/d in casks. Manchester: Concentrated solid, 60/62%, £11; commercial, £8.
Sodium Sulphite.—Pea crystals, spot, £13 5s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.
Sulphate of Copper.—£20 per ton, less 2%, in casks. Manchester: £26 10s. per ton f.o.b. Scotland: £25 per ton less 5%, Liverpool, in casks.
Sulphur Precip.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
Zinc Sulphate.—Crystals, £9 per ton, f.o.r., in bags.

Rubber Chemicals

Antimony Sulphide.—Golden, 6½d. to 1s. 1d. per lb., according to quality. Crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.
Arsenic Sulphide.—Yellow, 1s. 5d. to 1s. 7d. per lb.
Barytes.—£6 to £7 10s. per ton, according to quality.
Cadmium Sulphide.—6s. to 6s. 3d. per lb.
Carbon Bisulphide.—£31 to £33 per ton, according to quantity, drums extra.
Carbon Black.—3 11/16d. to 4 13/16d. per lb., ex wharf.
Carbon Tetrachloride.—£41 to £46 per ton, according to quantity, drums extra.
Chromium Oxide.—Green, 1s. 2d. per lb.
Diphenylguanidine.—2s. 2d. per lb.
India-rubber Substitutes.—White, 4½d. to 5d. per lb.; dark, 3¾d. to 4¼d. per lb.
Lamp Black.—£22 to £23 per ton d/d London; vegetable black, £28 to £48.
Lead Hyposulphite.—9d. per lb.
Lithopone.—30%, £16 10s. to £17 5s. per ton.
Sulphur.—£9 to £9 5s. per ton. Sulphur precip. B.P., £55 to £60 per ton. Sulphur precip. comm., £50 to £55 per ton.
Sulphur Chloride.—5d. to 7d. per lb., according to quantity.
Vermilion.—Pale, or deep, 5s. 3d. per lb., 1-cwt. lots.
Zinc Sulphide.—10d. to 11d. per lb., according to quality.

Nitrogen Fertilisers

Sulphate of Ammonia.—Neutral quality, basis 20.6 per cent. nitrogen, delivered in 6-ton lots to farmer's nearest station, £7 5s. per ton.
Calcium Cyanamide.—£7 5s. per ton, carriage paid to any railway station in Great Britain in lots of four tons and over.
Nitro-Chalk.—£7 5s. per ton for delivery to end of June.
Nitrate of Soda.—£7 12s. 6d. per ton for delivery up to end of June.
Ammonium Phosphate Fertilisers.—£10 5s. to £13 15s. per ton for delivery up to end of June, delivered in 6-ton lots to farmer's nearest station.

Coal Tar Products

Acid, Cresylic.—97/99%, 4s. 7d. to 5s. per gal.; 99/100%, 4s. 11d. to 5s. 3d., according to specification; pale 99%, 4s. 9d. to 4s. 10d.; dark, 3s. 10d. to 4s. Glasgow: Pale, 99/100%, 4s. 6d. to 5s. per gal.; pale 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. to 4s. 3d.; high boiling acids, 2s. 4d. to 2s. 8d. American specification, 4s. to 4s. 3d. Manchester: Pale, 99/100%, 5s.
Acid, Carbolic.—Crystals, 6¾d. to 7¼d. per lb.; crude, 60's, 3s. 5d. to 3s. 8d. per gal. Manchester: Crystals, 7¼d. per lb.; crude 3s. 6d. per gal. Glasgow: Crude, 60's, 3s. 2d. to 3s. 8d. per gal.; distilled, 60's, 4s. to 4s. 3d.
Benzol.—At works, crude, 9½d. to 10d. per gal.; standard motor 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 8d. to 1s. 8½d. London: Motor, 1s. 3½d. Glasgow: Crude, 9½d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 5d.
Creosote.—B.S.I. Specification standard, 5¾d. to 6d. per gal. f.o.r. Home, 3¾d. d/d. London: 4¼d. f.o.r. North: 5d. London. Manchester: 5½d. to 6½d. Glasgow: B.S.I. Specification 5½d. to 6d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils, 5d. to 5½d.
Naphtha.—Solvent, 90/160%, 1s. 7d. to 1s. 8d. per gal.; 95/160%, 1s. 8d.; 90/190%, 1s. 2d. to 1s. 3d. London: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. Glasgow: Crude, 6d. to 6¾d. per gal.; 90% 160, 1s. 6d. to 1s. 7d. 90% 190, 1s. 1d. to 1s. 2d.
Naphthalene.—Crude, whizzed or hot pressed, £12 to £13 per ton; purified crystals, £18 to £20 per ton in 2-cwt. bags. London: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. Glasgow: Fire lighter, crude, £6 to £7 per ton (bags free). Manchester: Refined £22 per ton f.o.b.
Pyridine.—90/140%, 9s. to 10s. per gal.; 90/180, 2s. 9d. to 3s. 6d. Glasgow: 90% 140, 9s. to 10s. per gal.; 90% 160, 7s. to 8s.; 90% 180, 2s. 6d.
Toluole.—90%, 2s. per gal.; pure, 2s. 5d. Glasgow: 90%, 120, 1s. 10d. to 1s. 11d. per gal.
Pitch.—Medium, soft, 36s. to 37s. per ton, in bulk at makers' works. Manchester: 36s. f.o.b., East Coast. Glasgow: f.o.b. Glasgow, 28s. 6d. to 35s. per ton; in bulk for home trade, 32s. 6d.
Xylol.—Commercial, 2s. 2d. per gal.; pure, 2s. 4d. Glasgow: Commercial, 1s. 11d. to 2s. per gal.

Wood Distillation Products

Acetate of Lime.—Brown, £8 10s. to £9 per ton; grey, £10 10s. to £11 10s. Liquor, brown, 30° Tw., 6d. to 8d. per gal. Manchester: Brown, £9 10s.; grey, £11 10s.
Charcoal.—£5 15s. to £11 per ton, according to grade and locality.
Methyl Acetone.—40-50%, £42 to £45 per ton.
Wood Creosote.—Unrefined 6d. to 1s. 6d. per gal., according to boiling range.
Wood, Naphtha, Miscible.—2s. 9d. to 3s. 3d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.
Wood Tar.—£2 10s. to £4 per ton.

Intermediates and Dyes

Acid, Benzoic, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.
Acid, Gamma.—Spot, 4s. per lb. 100% d/d buyer's works.
Acid, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
Acid Naphthionic.—1s. 8d. per lb.
Acid, Neville and Winther.—Spot, 3s. per lb. 100%.
Acid, Sulphanilic.—Spot, 8d. per lb. 100%, d/d buyer's works.
Aniline Oil.—Spot, 8d. per lb., drums extra, d/d buyer's works.
Aniline Salts.—Spot, 8d. per lb. d/d buyer's works, casks free.
Benzidine, HCl.—2s. 5d. per lb., 100% as base, in casks.
m-Cresol 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-Cresel 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.
p-Cresol 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.
Dichloraniline.—2s. 3d. per lb.
Dimethylaniline.—Spot, 1s. 6d. per lb., package extra.
Dinitrobenzene.—7½d. per lb.
Dinitrochlorbenzene, Solid.—£72 per ton.
Dinitrotoluene.—48/50° C., 8½d. per lb.; 66/68° C., 10d.
Diphenylamine.—Spot, 2s. per lb., d/d buyer's works.
α-Naphthol.—Spot, 2s. 4d. per lb., d/d buyer's works
β-Naphthol.—In bags, £88 15s. per ton; in casks, £89 15s.
α-Naphthylamine.—Lumps, 1s. per lb.; ground, 1s. 0½d. in casks.
β-Naphthylamine.—Spot, 2s. 9d. per lb., d/d buyer's works in casks.
o-Nitraniline.—3s. 11d. per lb.
m-Nitraniline.—Spot, 2s. 7d. per lb., d/d buyer's works.
p-Nitraniline.—Spot, 1s. 8d. to 2s. 1d. per lb. d/d buyer's works.
Nitrobenzene.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.
Nitronaphthalene.—9d. per lb.; P.G., 1s. 0½d. per lb.
Sodium Naphthionate.—Spot, 1s. 9d. per lb., 100% d/d buyer's works.
o-Toluidine.—10½d. per lb., in 8/10-cwt. drums, drums extra.
p-Toluidine.—1s. 10½d. per lb., in casks.
m-Xylidine Acetate.—4s. 3d. per lb., 100%.

Latest Oil Prices

London, April 14.—Linseed Oil was firm. Spot, £31 5s. per ton (small quantities), April, £28 17s. 6d.; May-Aug., £29 5s.; Sept.-Dec., £29 10s., naked. Soya Bean Oil was inactive. Oriental (bulk), afloat Rotterdam, £28 5s. per ton. Rape Oil was quiet. Crude extracted, £36 per ton; technical refined, £37, naked, ex wharf. Cotton Oil was quiet. Egyptian crude, £30 10s. per ton; refined common edible, £34 5s.; deodorised, £36 5s., naked, ex mill (small lots £1 10s. extra). Turpentine was quiet. American, spot, 39s. per cwt.

Hull.—Linseed Oil, spot, quoted £29 5s. per ton; April, £28 17s. 6d.; May-Aug., £29 2s. 6d.; Sept.-Dec., £29 7s. 6d. Cotton Oil.—Egyptian crude, spot, £31 per ton; edible, refined, spot, £33 15s.; technical, spot, £33 15s.; deodorised, £35 15s., naked. Palm Kernel Oil.—Crude, f.m.q., spot, £30 10s. per ton, naked. Groundnut Oil.—Extracted, spot, £33 10s. per ton; deodorised, £36 10s. Rape Oil.—Extracted, spot, £35 per ton; refined, £36. Soya Oil.—Extracted, F.o.r.r or f.a.s., 27s. 6d. per cwt., in barrels. Castor Oil.—spot, £33 10s. per ton; deodorised, £36 10s. Cod Oil.—Pharmaceutical, 46s. per cwt.; first, 41s.; second, 39s. Turpentine.—American, spot, 41s. per cwt.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

DOLMAN, LTD., Bolton, manufacturers of synthetic stone, etc. (M., 17/4/37.) April 3, charge, to Westminster Bank, Ltd., securing all moneys due or to become due to the Bank; charged on Folds Mill, Bolton.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

STOCKLEY BASS AND TANNER, LTD., 14-15 Chandos House, Buckingham Gate, S.W., manufacturing chemists. (C.C., 17/4/37.) £15 0s. 3d. March 1.

Deed of Arrangement

(The following deeds of arrangement with creditors have been filed under the Deeds of Arrangement Act, 1914. Under this Act it is necessary that private arrangements other than those executed in pursuance of the Bankruptcy Act shall be registered within seven clear days after the first execution by the debtor or any creditor. These figures are taken from the affidavit filed with the registered deed, but may be subject to variation on realisation.)

FRITH, SAML., White Lund, and 157 Euston Road, Morecambe and Heysham, tar macadam manufacturer, Tr. A. Edmondson, Union Bank Chambers, Morecambe and Heysham. (D.A., 17/4/37.) Dated April 6; filed April 12. Secured creditors, £1,239; liabilities unsecured, £3,236; assets, less secured claims, £3,442.

Bill of Sale

BILSON, ALGERNON BASIL, 59 Nathams Road, North Wembley, analytical chemist. (B.S., 17/4/37.) Dated April 6; filed April 9. £30 0s. 0d.

Companies Winding-up Voluntarily

ALBA CHEMICAL CO., LTD. (C.W.U.V., 17/4/37.) By extraordinary resolution March 31, E. A. Elliott, 11 Hornby Street, Heywood, nominated liquidator.

Forthcoming Events

LONDON.

April 19.—Institute of Fuel. "The Present Work and Future Programme of the Coal Research Laboratory at the Carnegie Institute of Technology, Pittsburgh." Dr. H. H. Lowry. 6 p.m. Lecture Theatre of the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London.

April 20.—Society of Chemical Industry. (Plastics Group). "Alcohol as a Potential Source of Plastics." H. Langwell. 7.30 p.m. Burlington House, Piccadilly, London.

April 23.—Physical Society. Ordinary meeting. 5 p.m. Imperial College of Science and Technology, South Kensington.

April 23.—Royal Institution of Great Britain. "The Synthesis of Large Molecules." Professor Dr. H. Mark. 9 p.m. 21 Albemarle Street, London.

MANCHESTER.

April 19.—Institution of the Rubber Industry. (Manchester Section). Annual general meeting. 7 p.m. Constitutional Club, St. Ann's Street, Manchester.

NEWCASTLE-UPON-TYNE.

April 23.—North East Coast Chemical and Allied Organisations. Annual dinner. 7.30 p.m. Central Station Hotel, Newcastle-upon-Tyne.

Company News

Sadler and Co.—An interim of 3 per cent. in respect of year to June 30, 1937 (same) is announced.

British Tar Products.—An interim of 6¼ per cent., less tax (same) on both preferred ordinary and ordinary shares, payable April 20, is announced.

Lewis Berger and Sons.—The directors have declared an interim dividend on the ordinary shares in respect of the year ending July 31, 1937, of 6 per cent. actual, less tax, payable May 1. This is at the same rate as last year's interim, which was followed by a final of 10 per cent. Of an authorised capital of £1,000,000, £927,275 is in issue, £400,000 being in 7 per cent. cumulative preference and £527,275 in ordinary shares of £1.

Cellon.—A final ordinary dividend for 1936 of 12½ per cent., less tax, is announced, payable April 27, making 20 per cent. This compares with 10 per cent. for 1935. Authorised and issued capital is £170,000 divided into £90,000 in 6 per cent. £1 preference shares and £80,000 in 5s. ordinary shares. Made into a public company in 1935, Cellon, Ltd., are manufacturers of aeroplane dopes and enamels.

Stream-Line Filters.—The first report for the period April 7 (date of incorporation) to December 31, 1936, shows a net trading profit of £16,568. After charging directors' fees and depreciation there remained £15,589; £2,100 to reserves, forward £2,286. Preliminary expenses of £1,030 were written off. Dividend at rate of 20 per cent. per annum, less tax, for period, of which interim of 7½ per cent., actual, was paid.

Goodlass Wall and Lead Industries.—The directors recommend a dividend of 6 per cent. actual, plus a bonus of 1 per cent. actual, both less tax, on the ordinary shares in respect of the year ended December 31, 1936. For the two previous years the holders of the £1,204,677 10s. of ordinary capital received dividends of 6 per cent. The total amount in issue is £3,002,535, there being in addition to the ordinary shares £1,346,050 in 7 per cent. cumulative preference shares of £1 and £451,807 10s. in 7 per cent. preferred ordinary shares of 10s.

British Drug Houses.—A rise in trading profits of £11,530, to £71,296, is reported for 1936. Deducting amortisation of leaseholds and depreciation, directors' fees and tax, there is a balance of £56,714, which, with £11,032 brought in, makes a total of £67,746. The dividend on the £325,000 of 5 per cent. cumulative preference shares absorbed £16,250, and, as already announced, the holders of the £400,000 of £1 ordinary shares are to receive 1 per cent. more at 6 per cent., less tax. This requires £24,000, and after writing off the balance of expenditure on leasehold premises surrendered, amounting to £8,930, and transferring £7,500 (against £10,000) to reserve, £11,066 is carried forward. Meeting, 21 Tothill Street, April 21, at 12 noon.

Jenson and Nicholson.—A further improvement in profits is announced. Trading profit in 1936 was £64,648, against £63,559 in 1935 and £55,934 in 1934. Net profit was £49,351, out of which the directors recommend a dividend of 10 per cent. on the ordinary shares—the same as for the previous year. After the preference dividends, placing £2,500, against £2,000, to reserve, £2,236 compared with £3,298 to preference dividend reserve, and providing £4,500 for contingencies in respect of Spanish assets, the balance of £3,238 is to be carried forward. The issued capital of £503,600 is divided into 153,231 6 per cent. cumulative preference, 100,000 6½ per cent. cumulative preference, 200,000 7 per cent. "A" cumulative preference shares, and 50,369 ordinary shares of £1.

British Celanese.—The directors state that the half-year's dividend on the 7 per cent. first cumulative preference shares, due on April 30, 1937, will be paid on that date to holders registered on April 14. The directors also state that a decision regarding payment of a dividend on the 7½ per cent. participating second cumulative preference shares will be made at the close of the company's financial year, i.e., June 30, 1937. During the last financial year the company paid 3½ years' dividends on the first preference shares, extinguishing all arrears thereon, and in November paid a half-year's dividend on the second preference shares, bringing the dividend up to October 30, 1930. No dividend has yet been paid on the ordinary shares.

United Premier Oil and Cake.—A slight fall in profits is shown in the 1936 accounts. The net amount receivable from subsidiaries was £117,481 (including £23,648 from profits of previous years), compared with £127,203 in 1935, and the net profit £99,115, against £114,148. The preference dividend has been paid and also an interim of 4 per cent. on the ordinary. A final on the latter shares of 6 per cent., making 10 per cent., and a cash bonus of 2½ per cent., are now recommended. The dividend it at the same rate as in 1935, but is payable on a larger capital, as the shares issued as a bonus in 1935 rank for the full year's dividend. To provide for last year's share bonus, £34,978 was taken from reserve. The directors have now transferred £25,022 to reserve out of the profits for the past year, thus making a total of £60,000 to the credit of that account, which has been reduced to £10,000 by the transfer of £20,000 to obsolescence and depreciation reserve. After these allocations, the amount to go forward is £39,646.